

# A systematic review evaluating the impact of task shifting on access to antiretroviral therapy in sub-Saharan Africa

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## Abstract

**Background:** Task shifting, defined for this review as the shifting of ART initiation and management from physicians to nurses, has been proposed as a possible method to increase access to HIV treatment in Sub-Saharan Africa.

**Objective:** To critically evaluate the literature on task shifting, determining if there is evidence to support this view.

**Methods:** A systematic search of the literature was undertaken, with both peer reviewed publications and conference abstracts presenting original data eligible for inclusion. Studies were evaluated according to methodology and discussion of confounding factors.

**Results:** We identified 25 articles which evaluated the effect of task shifting on access to ART. The evidence was mixed. Although there is a significant body of field reports indicating that task shifting increases access, these studies were of low methodological quality. The only randomized controlled trial included in this review did not find that task shifting increased in access.

**Conclusion:** Task shifting appears to be most effective at increasing access when combined with other interventions and financial support. There is a need for more research into the effects of task shifting policies, especially randomized controlled trials and high quality cohort studies.

**Key words:** task shifting, antiretroviral therapy, nurse provided treatment, substitution of physicians, access to HIV treatment  
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## Introduction

While the spread of HIV/AIDS is a global epidemic, Sub-Saharan Africa is the region most highly affected.<sup>1</sup> One factor limiting the scale up of antiretroviral therapy and other HIV services is the severe health care worker shortage facing Africa.<sup>2</sup> Task shifting, the gradual transfer of ART management and initiation from doctors to nurses and other non-physician clinicians, has been proposed to address this problem. Task shifting has been well studied in both high and low resource settings and good patient outcomes have been consistently reported. A 2010 systematic review of task shifting with regard to antiretroviral therapy concluded that nurse managed ART offered high quality care equivalent to physician managed care.<sup>2</sup> Because of the existing strong evidence and consensus in the literature that task shifting has good outcomes, this

systematic review will not focus on evaluating patient outcomes. Instead, this review will evaluate whether task shifting of ART initiation and management from physicians to nurses increases access to antiretroviral therapy, the primary purpose cited for the implementation of task shifting policies.

## Methods

To identify articles for this review, three search themes were combined with the boolean operator “and”. The first search theme was centered around task shifting, which was combined with the theme of HIV and the theme of antiretrovirals. Multiple synonyms for each theme were used. The following databases were searched until February 2012: PubMed, South African Health Research Index, Cochrane Central Register of Controlled Trials, Popline, CINAHL, EMBASE, AIDSLine, Social Science Citation Index and Arts & Humanities Citation Index. The abstract databases of the International AIDS Society Conferences, the Conferences on Retroviruses and Opportunistic Infections and the conferences of the International Society of Sexually Transmitted Disease Research were searched. Bibliographies of relevant papers were also reviewed and a grey literature search was

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conducted. Literature had to be applicable to Sub-Saharan Africa or low resource settings and had to measure access to antiretroviral therapy. Patient enrollment was used as the primary indicator of access while wait times, workforce and loss to follow up were evaluated as secondary measures of access. Articles identified as relevant to access to ART were evaluated for quality according to methodology and discussion of confounding factors.

## Results

### Search Process

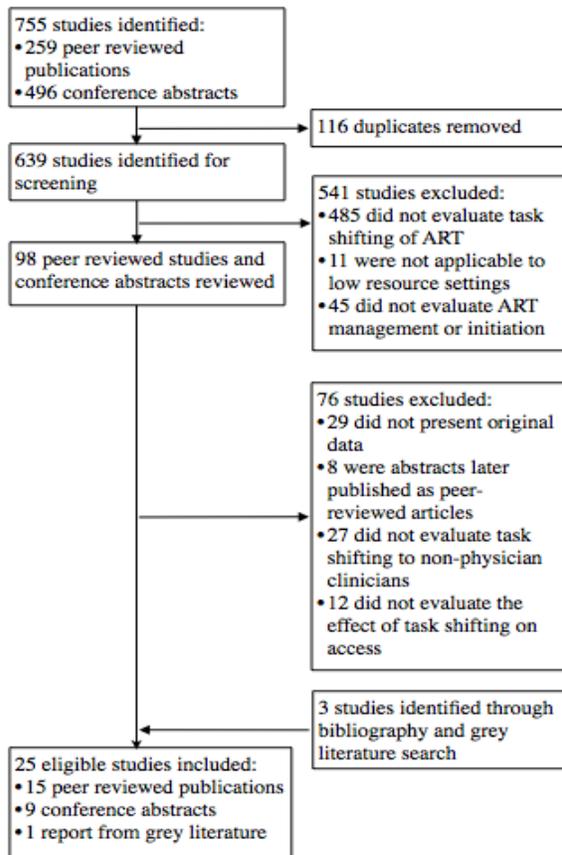
Following search and screening, twenty-five studies were chosen for inclusion in the review. (Figure 1) Due to the heterogenous nature of the results, a quantitative meta-analysis would have been inappropriate. Instead, a qualitative synthesis was used to evaluate the existing evidence.

**Table 1: Characteristics of studies considered in this systematic review**

Source	Location	Design/ Size	Measurement	Outcomes	Methodological limitations
Assefa et al. 2011 <sup>9</sup>	Ethiopia	Cohort/ 184 978	Loss to follow up	Nurse managed care reduced loss to follow up but there was a high cost for training and mentorship	Facilities were not selected randomly, loss to follow up was not investigated
Bedelu et al. 2007 <sup>16</sup>	South Africa	Cohort/ 1025	Enrollment	Task shifting policies doubled enrollment	Many other program improvements used
Bemelmans et al. 2010 <sup>15</sup>	Malawi	Cohort/ 23 361	Enrollment	Task shifting double enrollment to 23 361 patients, allowed for universal access with in Thylo, Malawi	Many other program improvements used
Brennan et al. 2011 <sup>11</sup>	South Africa	Cohort/ 2772	Loss to follow up	Down referral to nurse managed treatment resulted in reduced loss to follow up rates	Single clinic examined
Cohen et al. 2009 <sup>19</sup>	Lesotho	Cohort/ 13 243	Enrollment	Annual enrollment doubled from 2006 to 2008 with no increase in human resources through task shifting	Other improvements including early initiation of ART, external funding
Fairall et al. 2012 <sup>27</sup>	South Africa	RCT/ 15 571	Enrollment	No significant reduction in waiting list mortality for task shifting clinics (HR = 0.92 for death, p=0.53)	Only 26% of patients in the nurse cohort were initiated by a nurse
Fredlund et al. 2007 <sup>22</sup>	South Africa	Cohort/ 1311	Enrollment	Decentralization to a primary clinic improved access, nurse initiation of ART prevented waiting lists	Decentralization and community support were used
Hartman et al. 2011 <sup>13</sup>	Ethiopia	Cohort/ 80 000	Enrollment	Nurse managed ART services provided to 80 000 people, loss to follow up rate is 9% compared to 20% nationally	Not peer reviewed, no comparison group, significant external funding
Hulela et al. 2008 <sup>24</sup>	Botswana	Cohort/ 20 000	Enrollment	Task shifting increased access to ART, allowed 20 000 patients to receive treatment at rural clinics	Not peer reviewed, no comparison group or discussion of confounding factors
Humphreys et al. 2010 <sup>7</sup>	Swaziland	Cohort/ 474	Loss to follow up	Nurse managed ART resulted in increased clinic attendance and retention	Decentralization also present
Ivers et al. 2011 <sup>21</sup>	Haiti	Survey/ 11114	Enrollment	11 114 people were enrolled in ART therapy over five years using a task shifting model; Currently no waiting lists for treatment; Low rates of loss to follow up	External funding, observational study

Source	Location	Design/ Size	Measurement	Outcomes	Methodological limitations
Iwu et al. 2010 <sup>5</sup>	Nigeria	Cohort/ —	Wait times	Wait times decreased by 62%, physician workload decreased by 41%	Not peer reviewed, no comparison group
Kamiru et al. 2010 <sup>26</sup>	Swaziland	Cohort/ 534	Enrollment	Establishments of 7 clinics with nurse ART management allowed for the enrollment of 534 patients	Not peer reviewed, no comparison group, decentralization also present
Loubiere et al. 2009 <sup>23</sup>	Cameroon	Survey/ 2566	Enrollment	Patients were less likely to be treated in central hospitals lacking a task shifting policy	Survey, confounding factors, different forms of task shifting used
McGuire et al. 2011 <sup>8</sup>	Malawi	Cohort/ 10 822	Loss to follow up	Nurse managed care resulted in reduced loss to follow up	Not peer reviewed, possible confounding factors not described
Morris et al. 2009 <sup>18</sup>	Zambia	Cohort/ 71 000	Enrollment	Task shifting allowed for the enrollment of 71 000 patients over 19 urban sites.	Significant external funding, intensive use of resources
Namugw- ere et al. 2011 <sup>25</sup>	Uganda	Cohort/ 1992	Enrollment	Training of two nurses at a clinic resulted in enrollment increasing by 19.7%	Not peer reviewed, no comparison group, only a single clinic
O'Brien et al. 2008 <sup>6</sup>	Rwanda	Modeling/ 3194	Workforce	Task shifting would reduce Rwanda's increase in national physician capacity to reach its ART targets by 41%	Not peer reviewed, model based off of three non- representative clinics
O'Connor et al. 2011 <sup>14</sup>	South Africa	Cohort/ 3361	Loss to follow up	Retention at a nurse managed referred site in Johannesburg was 95%	No comparison site, other improvements including decentralization
Sherr et al. 2009 <sup>20</sup>	Mozambique	Cohort/ 6000	Enrollment	Facilities providing ART were able to triple within six months,	No comparison group
Shumbusho et al. 2009 <sup>12</sup>	Rwanda	Cohort/ 3194	Loss to follow up	Patient retention in three nurse managed clinics (89%) was comparable to national average for similar size clinics (87%)	No comparison site, patients were followed for relatively short periods
Wanyenze et al. 2010 <sup>3</sup>	Uganda	Time-motion study/689	Wait times	Waiting time was longest a nurse managed clinics, nurses spent twice the time with patients compared with doctors, task shifting may not be efficient in terms of time	Only compared one nurse managed clinic to two physician managed clinics
Were et al. 2011 <sup>10</sup>	Kenya	Cohort/ 11800	Loss to follow up	Clinics with task shifting had an 18% decreased risk of death/LTFU	Not peer reviewed, two clinics, did not separate death from loss to follow up
Udegboka et al. 2009 <sup>4</sup>	Nigeria	Cohort/ —	Wait times	Average wait time reduced from ten hours to six hours through task shifting	Not peer reviewed, no comparison group, only one district hospital considered
Zachariah et al. 2009 <sup>17</sup>	South Africa	Cohort/ 1634	Enrollment	When task shifting from doctors to nurses in Lusikisiki was reversed, ART initiation rates dropped	Inconclusive, confounding factors not described in paper

**Figure 1: Flow chart of search and screening process**



### Wait times and Workforce

There have been many studies examining the effects of task shifting on secondary measures of access including wait times, workforce hours and retention in care (loss to follow up). The evidence is mixed. Wanyenze et al.<sup>3</sup> found that wait times in nurse managed clinics were significantly longer than those in physician managed clinics while two contradictory studies found that task shifting resulted in a decrease in mean wait time.<sup>4,5</sup> O'Brien et al. measured the effect that task shifting has on physicians' workload in Rwanda on the assumption that a reduced workload would allow physicians to redirect their time to enrolling patients.<sup>6</sup> They calculated that without task-shifting policies, Rwanda will need to increase their physician workforce by 52% to hit ART enrollment targets. With task shifting policies, this increase is reduced to 11%.

### Loss to Follow up

There is a significant body of evidence indicating that nurse managed care increases retention and

reduces loss to follow up. Cohort studies from Swaziland<sup>7</sup>, Malawi<sup>8</sup>, Ethiopia,<sup>9</sup> Kenya<sup>10</sup> and South Africa<sup>11</sup> all found that clinics with task-shifting policies had reduced loss to follow up rates compared to similar clinics lacking task-shifting policies. Cohort studies in Rwanda<sup>12</sup>, Ethiopia<sup>13</sup> and South Africa<sup>14</sup> found that the retention rates at nurse managed clinics, 89%, 91% and 95% respectively, were above the national average in each country.

### Patient Enrollment

There are a number of field reports suggesting that task shifting can be used to increase enrollment in antiretroviral therapy on a district and nation wide scale. In Thyolo, Malawi, task shifting from doctors to non-physician clinicians (primarily nurses) doubled ART initiation and allowed for universal access by 2009.<sup>15</sup> In Lusikisiki, South Africa, ART initiation by nurses within rural clinics allowed for the doubling of initiation of patients.<sup>16</sup> When this form of task shifting was reversed in 2006, with ART initiation restricted to physicians, ART initiation rates declined.<sup>17</sup> Task shifting policies in Zambia<sup>18</sup> Lesotho<sup>19</sup> and Mozambique<sup>20</sup> were all reported to allow for a dramatic increase in patient enrollment. Studies in Haiti<sup>21</sup>, South Africa<sup>22</sup> and Cameroon<sup>23</sup> all found that task shifting policies reduced waiting lists for HIV treatment. Field reports from Botswana<sup>24</sup>, Uganda<sup>25</sup> and Swaziland<sup>26</sup> observed task shifting policies increased the enrollment of patients at primary clinics.

The only randomized controlled trial evaluating task shifting's effect on access recently reported initial data. The Streamlining Tasks and Roles to Expand Treatment and Care for HIV (STRETCH) trial randomly assigned 16 clinics in the Free State Province of South Africa to put in place policies of nurse managed and initiated HIV treatment and compared them to fifteen clinics which kept conventional physician care.<sup>27</sup> This trial occurred under the normal constraints of a public health system in a middle income country; training for nurse initiated ART was hindered by the high turnover rate and there was also difficulty in maintaining adequate ART supplies. Contrary to expectations, nurse initiation of antiretroviral therapy did not reduce waiting list mortality, with a hazard ratio of 0.92 for death ( $p=0.532$ ) between nurse initiated and physician initiated clinics. However, this effect varied with patients' CD4 levels. The waiting list mortality for patients with CD4 <200 was equivalent for nurse and physician initiated clinics (HR = 1.0) while the

waiting list mortality for patients with CD4 levels between 200 and 350 was reduced, although not significantly, at nurse initiated clinics (HR = 0.73,  $p = 0.052$ ). There is an apparent contradiction between the evidence from this randomized controlled trial and the body of field reports, which will be elaborated on further in the discussion.

## Discussion

The reported ability of task shifting to improve access to ART varies according to the measurement of access and the quality of the study. There is strong and consistent evidence that task shifting reduces loss to follow up and increases retention in care from studies in multiple countries in sub-saharan Africa. This has been attributed to the decentralization associated with task shifting.<sup>16</sup> Providing treatment closer to patients' homes removes barriers associated with travel such as costs and taking time off work.<sup>16</sup> As clinicians tend to be concentrated in urban areas, the availability of physicians to prescribe ART at peripheral sites can be the limiting factor for treatment.<sup>16</sup> Task shifting can thus strengthen the positive effects of decentralization by increasing the availability of clinicians at peripheral sites.

Field reports from multiple countries including Swaziland, Uganda, Rwanda, South Africa and Lesotho have all found that task shifting increases patient enrollment in ART. However, many of these studies suffer from significant methodological flaws such as a lack of comparison group. Further increasing the difficulty in interpreting these reports is the presence of confounding factors. Task shifting to nonphysician clinicians was typically only one of several interventions reported in these studies. Many included separate task shifting to lay workers<sup>15, 16</sup>, the use of first line tenofovir<sup>19</sup> and community support<sup>22</sup>. These interventions have also benefited from substantial external funding from NGOs and may not reflect what is feasible within the constraints of a public health system<sup>28</sup>. The STRETCH randomized controlled trial, on the other hand, was conducted within all of the usual constraints of an underfunded public health system. Initial results, however, have indicated that it did not improve access to ART, as measured by a statistically significant decrease in waiting list mortality<sup>27</sup>. A possible explanation for this apparent lack of effect is the difficulty in training nurses for their new roles and the high staff turnover throughout the trial.<sup>27</sup> Only 26% of patients in the nurse initiated arm of the trial were actually initiated by nurses, suggesting that

the STRETCH intervention was not fully implemented in the nurse initiating clinics<sup>27</sup>. The lack of a corresponding shifting of tasks from nurses to lay workers with the introduction of nurse initiated ART may also have overburdened nurses, inhibiting access to ART. In addition, the doctor initiated arm of the trial was able to dramatically increase prescribing rates during the trial.<sup>27</sup>

With the lack of high quality evidence that the STRETCH trial would have provided, it is difficult to validate the current expansion of nurse initiated care that is occurring in South Africa, Lesotho and other countries in Sub-Saharan Africa. However, the discrepancy between the results of the STRETCH trial and the field reports suggest external factors that may influence the efficacy of task shifting policies. The field reports suggest that improved access to ART came through a combination of task shifting policies with other interventions such as decentralization, task shifting to lay workers and community support, interventions lacking in the STRETCH trial. This suggests that task shifting should not be considered in isolation but rather as a part of the solution to the severe health care worker shortage in Africa. Task shifting to lay workers, for example, may be critical to ensuring that nurses' workloads stay manageable with the additional responsibilities of providing HIV treatment.<sup>16</sup> Without the further inclusion of lay workers, increased access to treatment may be limited by the availability of nurses<sup>16</sup>. Similarly, measures such as increased pay for health care workers to improve retention, investment in long term training and increases in funding may increase the likelihood that task shifting policies can improve access<sup>29</sup>. Additionally, there is a significant body of evidence demonstrating equivalent outcomes between nurse and physician initiated ART<sup>2</sup> and there is evidence suggesting potential cost savings through the adoption of task shifting policies.<sup>2</sup> In this view, task shifting policies should be considered as an effective method of providing ART but not an effective method of increasing access to ART unless combined with significant training, support and other interventions.

It is important to acknowledge the limitations of this review. Although this review focused on the task shifting of ART management and initiation, these two terms encompass a broad range of tasks including testing, prescription of medicine, dispensing medicine, detection of complications and referral. Studies which refer to the same form of task shifting

may, in practice, implement highly dissimilar forms.<sup>2</sup> While this hinders the comparison of studies, it may explain the variation in access seen in this review. Similarly, there can be substantial variation in the training and competencies of nurses or nonphysician clinicians between different countries and regions. Differing workloads prior to implementation of task shifting can also impact the ability of nurses to increase initiation rates, as previously mentioned.

There is substantial evidence that task shifting provides equivalent outcomes as traditional physician managed treatment<sup>2</sup> and this review provides further support for task shifting policies when implemented with additional strengthening programs. However, there remains resistance among many health authorities to implementing task shifting policies. Professional groups, for example, have objected to what they view as an encroachment of their authority.<sup>17</sup> If task shifting is to be adopted across Sub-Saharan Africa, it is critical that research be done to identify these barriers and methods of removal.

## Conclusion

Although there is a large body of literature evaluating the effect of task shifting on access to antiretroviral therapy, much of it is hampered by poor methodology and the presence of confounding factors. A recent randomized controlled trial comparing clinics with nurse initiated ART against clinics with only physician initiated ART failed to find a statistically significant increase in access to ART. However, there is evidence that when combined with other interventions to strengthen the workforce and increase funding, task shifting can be effective at improving access. Therefore, task shifting policies should be considered by nations attempting to improve access but only as part of a broader set of efforts to improve HIV treatment. There is a need for more research into the effects of task shifting policies, especially randomized controlled trials and high quality cohort studies. However, trials comparing HIV treatment with and without task shifting policies may pose ethical issues that should be carefully considered prior to implementation. Studies comparing the efficacy of various combinations of task shifting policies would also be valuable and could help determine which support and training mechanisms are necessary to provide high quality care.

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## Conflicts of Interest

The authors have no conflicts of interest to report.

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