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I. Introduction

A shortage of qualified health workers is a major constraint for accessing essential health care in Africa, which suffers more than 24% of the global burden of disease, and yet has only 3% of the world’s health workers. Currently, sub-Saharan Africa (SSA) is the region of the world with the lowest density of total health workers per 1,000 population, 2.3 compared to Europe with 18.9\textsuperscript{1}. At least 36 of the 46 countries in sub-Saharan Africa experience critical shortages in human resources. Due to this human resource shortage, many countries rely on “task shifting”. Task shifting is a process of delegation whereby tasks are moved, where appropriate, to less specialized health workers with shorter training and fewer qualifications\textsuperscript{2}. It presents a viable solution for improving health care coverage by making more efficient use of the human resources already available while longer training programs are expanded. However, for task shifting to be effective, tasks to be shifted should be selected based on research evidence, defined roles and critical supervision. Essentially, the primary objective of task shifting is two-fold. 1. Increase productive efficiency, that is, to increase the number of health care services provided at a given quality and cost, or, alternatively, to provide the same level of health care services at a given quality at a lower cost. 2. Reduce the time needed to scale up the health workforce, because the cadres performing the shifted tasks require less training. While task shifting has been occurring for decades, it is seen by some as becoming more urgent in sub-Saharan Africa because of the increasing healthcare needs and associated health worker shortages.

The objective of this paper is to explore the role of task shifting in addressing human resource for health shortages and improving service delivery in sub-Saharan Africa. This paper looks at task shifting in the context of sub-Saharan Africa and how it has been successfully applied in
different areas of service delivery as a means of addressing health worker deficiencies. The paper will specifically focuses on the following:

• Show how task shifting is helping to address shortages in the health workforce

• Highlight important areas of service delivery where task shifting has been successfully applied without compromising the quality of care

This paper constitutes a literature review of task shifting as an approach to improving health care delivery in sub-Saharan Africa. The paper presents evidence based results of task shifting as a means of expanding access to quality health care services. The paper also further promotes the delegation of task to lower cadres of health workers as an effective intervention in alleviating the crisis of health worker shortages in most sub-Saharan African countries.

II. Methodology

For the purposes of this paper, two methods were employed to inform the content of the paper as well as properly address its objectives. First, an extensive online search of published peer reviewed literature was conducted to identify articles pertaining specifically to task shifting in sub-Saharan Africa. The search was limited to documents published after 1990. In conducting the literature search, several search engines and organizational websites were used including but not limited to: Google Scholar, PubMed, the World Health Organization, Human Resources for Health, the Global Health Workforce Alliance (GHWA), and UNFPA. Key search terms included: task shifting, task sharing, skill mix, medical officer, assistant clinical officer, assistant nurse, auxiliary nurse, enrolled nurse, auxiliary health worker, health
care assistant, community health worker, midwives, midlevel health worker; and sub-Saharan Africa. Second, a search of selected organizational websites (WHO, UNFPA, and GHWA) for grey literature related to task shifting and health workforce in sub-Saharan Africa was conducted online. “Grey literature” stands for manifold document types produced on all levels of government, academics, business and industry in print and electronic formats that are protected by intellectual property rights, of sufficient quality to be collected and preserved by libraries and institutional repositories, but not controlled by commercial publishers; i.e. where publishing is not the primary activity of the producing body (Twelfth International Conference on Grey Literature in Prague in 2010). Key search words for the grey literature included; task shifting, sub-Saharan Africa, policies, guidelines, mid-level health worker. All the literature that was identified from both searches were screened for relevance by reading either the abstract or the introduction after which the most relevant references were selected for this paper. A total of 25 relevant references were identified for this paper.

III. Background

WHO has identified a critical threshold in health workforce density below which high coverage of essential interventions, including those necessary to meet the health-related Millennium Development Goals (MDGs), is very unlikely. The threshold translates to a minimum of 23 doctors, nurses and midwives per 10,000 population. Based on this health workforce density threshold, there are currently 57 countries with critical shortages equivalent to a global deficit of 2.4 million doctors, nurses and midwives. Thirty six of these countries are in sub-Saharan Africa. In many parts of Sub-Saharan Africa there are fewer than 5 physicians for every 100,000 people, far below the recommended 20 physicians per 100,000 people (See Table 1). This
shortage is magnified in rural areas, where many health professionals have been leaving their posts to work in urban areas or other countries. Ultimately, these countries become faced with the task of training healthcare workers at a variety of levels to provide the basic care that is so desperately needed. The issue of health worker shortages in sub-Saharan Africa derives from many causes, including past investment shortfalls in pre-service training, international migration, career changes among health workers, premature retirement, morbidity and premature mortality. The health workforce situation in sub-Saharan Africa is ironical in the sense that sub-Saharan Africa has 11% of the world's population and carries 25% of the global disease burden, yet the region has only 3% of the global health workforce and accounts for less than 1% of health expenditures worldwide (See Table 2).

Table 1: WHO Estimates of Health Personnel per 100,000 Population for SSA (World health statistics 2013)5

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Density of physicians (per 100 000 population)</th>
<th>Density of nursing and midwifery personnel (per 100 000 population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
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<td>121</td>
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<tr>
<td>Angola</td>
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<td>166</td>
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<tr>
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<tr>
<td>Botswana</td>
<td>2006</td>
<td>34</td>
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<td>Burkina Faso</td>
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<td>5</td>
<td>57</td>
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<tr>
<td>Cameroon</td>
<td>2009</td>
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<td>44</td>
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<tr>
<td>Central African Republic</td>
<td>2009</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>Chad</td>
<td>2006</td>
<td>4</td>
<td>19</td>
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<tr>
<td>Congo</td>
<td>2007</td>
<td>10</td>
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<td>3</td>
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<td>2009</td>
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<td>2011</td>
<td>18</td>
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<td>8</td>
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<tr>
<td>Country</td>
<td>Year</td>
<td>Density of physicians (per 100 000 population)</td>
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<tr>
<td>--------------</td>
<td>------</td>
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</tr>
<tr>
<td>Zimbabwe</td>
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<td>125</td>
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</table>

Table 2: WHO Regional estimates of Health Personnel per 10,000 Population (World health statistics 2013)

<table>
<thead>
<tr>
<th>WHO Region</th>
<th>Year</th>
<th>Density of physicians (per 100 000 population)</th>
<th>Density of nursing and midwifery personnel (per 100 000 population)</th>
</tr>
</thead>
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<tr>
<td>African Region</td>
<td>2005 - 2012</td>
<td>25</td>
<td>91</td>
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<tr>
<td>Region of the Americas</td>
<td>2005 - 2012</td>
<td>204</td>
<td>715</td>
</tr>
<tr>
<td>South-East Asia Region</td>
<td>2005 - 2012</td>
<td>55</td>
<td>99</td>
</tr>
<tr>
<td>European Region</td>
<td>2005 - 2012</td>
<td>333</td>
<td>842</td>
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<tr>
<td>Eastern Mediterranean Region</td>
<td>2005 - 2012</td>
<td>108</td>
<td>159</td>
</tr>
<tr>
<td>Western Pacific Region</td>
<td>2005 - 2012</td>
<td>152</td>
<td>195</td>
</tr>
</tbody>
</table>

IV. Concept of task shifting/sharing for solution
The concept of task shifting is not a new one. In 19th century France, Officiers de Santé were an officially recognized and commonly used class of non-physician health care worker, while in China, so-called barefoot doctors were widely deployed across the country in the mid-20th century. In Africa, non-physician clinicians have long been trained across the continent to fill various roles.

Expanding the roles of less specialized health workers or “task shifting” is a process of delegation whereby tasks are moved, where appropriate, to less specialized health workers with shorter training and fewer qualifications. For instance, in situations where a health facility lacks an obstetrician, the medical officer can be trained to provide prerequisite obstetric services based on the contextual need. Task shifting in circumstances like the above is considered appropriate because the task is moved directly to the cadre below and the task still falls within the purview of a medical doctor. In certain circumstances where there is a paucity of medical doctors whether specialist or general practitioner, clinical assistants are given shorter training in the required specialty. This is common with obstetric surgery where clinical assistants are trained to perform emergency obstetric procedures such as caesarean sections. The clinical assistants who fill these positions are usually recommended, trained and supervised by physicians. If task shifting is to have effective and sustained results, it is appropriate that in most cases task be shifted to the cadre directly below. Task shifting becomes inappropriate when the level of specialization or skills demanded by a task greatly exceeds the professional training of the lower cadre such that the resultant effect of task shifting would be detrimental to the health service recipients as well as the health system.

Task shifting can also be defined as delegating tasks to existing or new cadres with either less training or narrowly tailored training. By reorganizing the workforce in this way, task shifting
can make more efficient use of existing human resources and ease bottlenecks in service delivery\textsuperscript{7}. Task shifting includes various scenarios, such as substituting tasks among professionals, delegating tasks to professionals with less training, including creating a new cadre, delegating tasks to non-professionals, or a combination of these\textsuperscript{2}. For example, the work can shift from specialist physicians to general practitioners, nurses, midwives, or assistant medical officers. Other cadre titles that participate in task shifting include clinical officer, assistant clinical officer, assistant nurse, auxiliary nurse, and community health worker\textsuperscript{2}. Where further additional human resources are needed, task shifting may also involve the delegation of some clearly delineated tasks to newly created cadres of health workers who receive specific, competency-based training. There are many examples of new professional cadres being developed, from health extension workers being trained in one year in vocational schools in Ethiopia, to assistant medical officers being trained in obstetrics in Mozambique, to physician assistants being trained in the United States\textsuperscript{2}. Task shifting, including the development of new professional cadres, has been occurring for quite some time in both high-income countries and low-income countries, but has become particularly more urgent in low-income countries due to paucity of healthcare service delivery personnel.

V. Global strategies on task shifting
The World Health Organization (WHO) has continued to encourage the concept of task shifting through the formulation of health management protocols that incorporate the shifting of task. In HIV care for instance, WHO's 2004 Integrated Management of Adult and Adolescent Illness (IMAI) guidelines, recommends that nurses and clinical aids be trained to provide primary care for HIV. More than 25 countries in SSA are currently using this set of simplified operational guidelines from WHO’s IMAI to train health workers. These guidelines clearly define the tasks required for chronic HIV/AIDS prevention, care, and antiretroviral therapy (ART), as well as tuberculosis care and co-management of TB/HIV/AIDS patients; they allow these interventions to be delivered by nurses, clinical officers, midwives and various cadres of medical assistants, working together in a clinical team in the hospital outpatient facility or in peripheral health centers. In 2008, the potentials for task shifting was further expanded and formalized by joint WHO/UNAIDS/PEPFAR guidelines for the implementation of task shifting as an immediate way to address staff shortages while delivering good quality care. These guidelines and recommendations constitute the Treat, Train, Retain (TTR) initiative and employs task shifting in the roll-out of ART in contexts with shortages of human resources. Countries such as Uganda, Ethiopia, South Africa and Malawi are currently implementing task shifting in efforts to deliver ART. Recently in 2012, WHO released its recommendations on optimizing health worker roles to improve access to key maternal and newborn health interventions through task shifting.

However, the rapidly emerging evidence from sub-Saharan Africa, where task shifting is seen as most relevant, has not been systematically reviewed. Such analysis is important, since task shifting has been the subject of much debate. In some countries, professional councils and associations have in some instances resisted delegation of tasks to lower cadres because they perceive them to be incapable of taking on the designated tasks. Critics have argued that task
shifting has become a "bandwagon" that is uncritically championed at the expense of existing health cadres, whose low pay and poor working conditions drive high attrition\(^6\). Several commentators have noted that even though this approach may be able to provide increased quality care particularly in HIV care, task shifting should not be a substitute for investments in the general health care systems, because even the best staffing models will be inadequate in areas with an absolute shortage of all levels of staff\(^6\).

If the increasing access to quality healthcare services offered by task shifting is to be sustained, there needs to be strong government commitment that will engender supportive policies and financing. These policies will ensure that an enabling regulatory framework for task shifting that takes into cognizance shiftable roles, adequate training, and continuous oversight is institutionalized.

VI. National policies on task shifting

Several countries in sub-Saharan Africa now have documented policies on specific task shifting involving a defined health service delivery practice. For example; Senegal, Rwanda, Ethiopia, Uganda, Nigeria, Malawi, and Madagascar all now have formal policies allowing community-based distribution of injectable contraception by community health workers (CHWs).\(^{11}\)

Similarly, countries like Ethiopia, Malawi, Namibia, Rwanda, Uganda and Zambia have policies that have been responsible for the successful implementation of the task shifting approach for HIV care delivery\(^7\). These countries started with operationalizing the WHO/UNAIDS/PEPFAR guidelines for task shifting in HIV/AIDS management and WHO has been working closely with them to identify and document the best clinical practices and to explore and understand the existing regulatory frameworks that are enabling the task shifting approach to be implemented in each country context.
The East, Central and Southern African Health Community (ECSA HC), an inter-governmental organization that fosters regional collaboration in health have established themselves as strong proponents of task shifting on a number of occasions. For instance, during the 46th Health Ministers Conference in 2008, ECSA member urged themselves to develop and implement policies, guidelines and training curricula on task shifting among health care providers that will allow mid-level cadres to carry out specifically identified activities such as caesarean section, manual removal of the placenta, manual vacuum aspiration and insertion of Norplant and intrauterine devices; and in turn shift non/less technical duties from mid-level to lower-level cadre staff such as community based distributors of contraceptives and patient attendants by 2011.12

VII. Evidence

a. Task shifting in family planning

Family-planning is unique among medical interventions in the breadth of its potential benefits: reduction of poverty, and maternal and child mortality; empowerment of women by lightening the burden of excessive childbearing; and enhancement of environmental sustainability by stabilizing the population of the planet. The unmet need for family planning in sub-Saharan Africa remains high especially among poor and rural populations. In many sub-Saharan countries, longer-acting injectable contraceptives, such as depot medroxyprogesterone acetate (DPMA) has become very popular because it is relatively cheap, effective, can be used privately, has a longer period of action than oral contraceptives or condoms and requires less frequent administration. Shifting the task of providing DPMA to community workers can provide access to these methods to a larger number of women. Community-based distribution of DMPA has been successful in several SSA country contexts demonstrating that community health workers
who receive proper training can administer DMPA injections to women with unmet need for family planning just as safely as clinic-based providers and with comparable rates of acceptability and continuation.\textsuperscript{14}

In 2004, a nonrandomized community trial to compare the safety and quality of contraceptive injections administered by community-based health workers with those of clinic-based nurses in a rural African setting was conducted in Nakasongola district of Uganda.\textsuperscript{15} This study was undertaken by the Uganda’s Ministry of Health in collaboration with Family Health International and Save the Children/USA. As at the time of the study, the contraceptive prevalence rate for a modern method was 18% in Uganda. Injectables were the most popular contraceptive method, accounting for about 57% of all modern methods used. The total fertility rate for Nakasongola district was about 7, while its contraceptive prevalence was estimated at 9%.\textsuperscript{15} In March 2004, twenty community-based reproductive health workers (CRHWs) in Nakasongola were trained to provide DMPA injections to their communities using single-use autodisable syringes. Prior to the trial, these health workers served as active providers of pills and condoms for one of the implementing partners. The sample size for the study was based on testing for the non-inferiority of services provided by CRHWs as measured by three-month reinjection rates for the clinic-based and CRHW clients. This research, conducted with more than 700 women, confirmed that well-trained community health workers who are experienced in condom and pill provision can safely provide injectable contraceptives.\textsuperscript{15} Further, the study showed that safety, acceptability, and quality of service delivery by the CHWs was comparable to that of clinic-based services.\textsuperscript{15} The study results inspired the Ministry of Health to decide, in 2006, that community-based distribution of injectables should continue in Nakasongola and that the practice should be expanded to other areas.\textsuperscript{16}
In 2007, research conducted by Hoke et al in Madagascar assessed the safety, effectiveness and acceptability of community-based distribution of DMPA injectables following the training of 61 lay health workers. After 7 months of service provision, an evaluation team reviewed service records and interviewed lay health workers, their supervisors and clients\textsuperscript{17}. Evaluation results showed that a total of 1662 clients received DMPA from lay health worker. It was also observed that lay health workers demonstrated competence in injection technique, counselling and management of clients’ re-injection schedule\textsuperscript{17}. Community distribution of DMPA via the lay health workers appeared to increase contraceptive use, with 41\% of new users accepting injectables as a method of family planning\textsuperscript{17}. Nearly, all the clients interviewed said they were satisfied and intended to return to the lay health workers for re-injection and would recommend this service to a friend\textsuperscript{17}. This community-based distribution model tested in Madagascar may be transferable to other settings in sub-Saharan Africa where there are total lack of health workers for similar family planning tasks. It can also be replicated in countries with similar needs including high unmet need for contraception, strong preference for injectable contraceptives, large segments of the population with poor access to health facilities, and a strained health work force.

b. Surgical Task shifting

Almost all maternal deaths (99\%) occur in developing countries. More than half of these deaths occur in sub-Saharan Africa\textsuperscript{18}. Along with insufficient access to emergency obstetric care (EmOC), scarcity of human resources for health (HRH), particularly specialized health workers greatly contributes to poor maternal outcomes in this region. The following studies were conducted in the area of obstetric task shifting in sub-Saharan African countries and compares health outcomes between patients who received care from physicians (medical graduates) and
patients who received care from non-physician providers (clinical officers, assistant medical officers).

**Mozambique** - To evaluate the outcome of caesarean delivery performed by assistant medical officers and specialists in obstetrics and gynecology with particular attention to post-operative complications, a nonrandomized analysis of 2,071 consecutive caesarean deliveries was performed at Maputo Central Hospital\(^1\). Of these, 958 (46.3\%) were performed by assistant medical officers (medical assistants trained for surgery) and the rest (53.7\%) by specialists in obstetrics and gynecology\(^1\). The age and parity distributions of women in the two groups were almost identical\(^1\). The results of the study showed there were no differences in the indications for caesarean delivery and that surgical interventions associated with caesarean delivery did not differ in the two groups\(^1\). The only significant difference was in the group of superficial wound separation due to hematoma, which was slightly more common in the group operated on by assistant medical officers\(^1\). The study went ahead to conclude that training selected medical assistants to perform caesarean delivery, even on women in poor general condition, is justified in settings with scarcity of doctors.

In 2002, a cross-sectional study of surgical procedures performed that year in all government hospitals in Mozambique was conducted\(^2\). This was linked to a longitudinal study of Tecnicos de cirurgia (TCs) and medical doctors graduating in 1987, 1988 and 1996\(^2\). Tecnicos de cirurgia (TCs) are assistant medical officers who have received surgical training. The purpose of the study was to make an inventory of all government hospitals so as to document obstetric surgery performed by TCs and also highlight their retention at district level. The study found that TCs performed 57\% of all major obstetric surgical interventions in Mozambique, including 92\% of
the interventions in district (rural) hospitals\textsuperscript{20}. After seven years, no medical doctor initially assigned to district (rural) hospitals remained there, while almost 90\% of TCs remained there\textsuperscript{20}.

**Malawi** - A 2007 multi-group comparison (non-random assignment) study of postoperative outcome of caesarean sections and other major emergency obstetric surgery by clinical officers and medical officers in Malawi by Chilopora et al using quantitative descriptive statistics showed that there were no post-operative differences between patients receiving obstetric surgery from clinical officers versus medical officers in terms of maternal general condition – both immediately and 24 hours postoperatively – and regarding occurrence of pyrexia, wound infection, wound dehiscence, need for re-operation, neonatal outcome or maternal death\textsuperscript{21}. It was also noted that clinical officers performed the bulk of emergency obstetric operations at district hospitals in Malawi and they constitute a crucial component of the health care team in Malawi for saving maternal and neonatal lives given the scarcity of physicians\textsuperscript{21}.

**Tanzania** - Another 2009 multi-group comparison (non-random assignment) study of the quality of emergency obstetric surgery by assistant medical officers in Tanzanian district hospital by McCord et al did not find significant differences between assistant medical officers and medical officers regarding patient outcomes and quality of care\textsuperscript{22}. Among 1,134 complicated deliveries and 1,072 major obstetrical operations, there were no significant differences between assistant medical officers and medical officers in outcomes, risk indicators, or quality\textsuperscript{22}. Patient outcomes included maternal death, perinatal death, and major post-operative complications. Quality of care measures included whether surgery was performed without an absolute maternal indication or clear fetal indication; delay of surgery by more than three hours; and absence of a blood transfusion when needed\textsuperscript{22}. In the context of Tanzanian, there are various levels of nonphysician clinicians. Clinical officers are secondary school graduates with three years of medical training.
They are qualified to diagnose and write prescriptions, to practice obstetrics, and to do minor surgery, but not cesarean sections. Assistant medical officers are selected by recommendation and examination from among the practicing clinical officers. They receive another two years of clinical training, including three months of surgery and three months of obstetrics, during which they are expected to have done at least five cesarean sections. After graduation they are licensed to practice medicine and surgery. Medical officers in Tanzania are medical school graduates with at least one year of internship and a license to practice medicine and surgery. Tanzania started training assistant medical officers to do cesarean sections and other emergency surgery in 1963, and so it has more experience with this than any other African country. There are now more than 1,300 surgically trained assistant medical officers working there, along with 5,000 clinical officers. Most assistant medical officers are assigned to district hospitals.

**Ethiopia** - In 2009, a retrospective study was conducted to assess the contribution of nonphysician clinicians (NPCs) to comprehensive emergency obstetric care (CEmOC) in Tigray, Ethiopia. NPCs are defined as health officers with 3 years of training in public health and clinical medicine plus 6 to 9 months in EmOC services, including obstetric surgery. The study involved a retrospective review of the obstetric records of all women treated from January 1, 2006, to December 31, 2008, at the 11 hospitals and 2 health centers with CEmOC status in Tigray. During the studied period 25,629 deliveries and 11,059 obstetric procedures (3369 of which were major surgical interventions) were performed at these 13 institutions. Overall, NPCs performed 63.3% of these procedures, which included 1574 (55.5%) of a total of 2835 cesarean deliveries. Whereas the cesarean deliveries performed by physicians were more often elective, those performed by NPCs were more often indicated by an emergency. Maternal deaths, fetal deaths, and length of hospital stay did not statistically differ by type of attending staff. Not only
did NPCs perform a significant proportion of emergency obstetric procedures in Tigray, but the postoperative outcomes achieved under their care were similar to those attained by physicians. Strengthening NPC training programs in emergency obstetric surgery should further reduce maternal and fetal mortality and morbidity in sub-Saharan Africa⁴.

These studies contribute to the body of evidence demonstrating that sharing and shifting surgical tasks is feasible and can substantially increase availability, quality, and equity in obstetric care. Strengthening programs to advance the training of clinical officers, assistant medical officers, and NPCs in CEmOC would contribute much to meeting the minimum standard of care and improve maternal health in parts of Sub-Saharan Africa similarly challenged by an acute shortage of physicians, especially in rural areas.

c. Task shifting in HIV Management

The global impact of HIV and AIDS especially in sub-Saharan Africa remains a public health concern. Regional statistics by the United Nations (UNAIDS, 2012) indicates that sub-Saharan Africa accounts for 23.5 million of the 34 million persons living with HIV/AIDS globally. This and the severe shortage of health professionals has tremendously strained the region’s health infrastructure. Initial research and evaluations of task-shifting focused on feasibility and acceptability but current evidence shows that task-shifting of ART initiation and prescription from doctors to nurses and other nonphysician providers in Africa, is viable, safe, cost-effective, widely accepted, and sometimes preferred by patients. It also increased access to ARTs without compromising quality and had better client retention and follow-up rates.

Between Jan 28, 2008, and June 30, 2010, a cluster-randomized trial was conducted to assess task shifting of antiretroviral treatment from doctors to primary-care nurses in the Free State
province of South Africa. The trial examined the training of nurses to initiate and re-prescribe antiretroviral therapy (ART) and the effect on mortality and viral load suppression in HIV/AIDS patients. Study results showed that there were no difference in patient mortality and viral load when nurse-led treatment was compared to doctor-led treatment. This study provided original evidence of the effectiveness of a nurse-led system on the clinically challenging task of ART initiation, including for patients recently or newly enrolled in the treatment program. It also showed that expansion of nurses' roles to include ART initiation can be done safely and can improve health outcomes and quality of care. This suggests that the approach of non-physician clinicians expanding ART program in resource-constrained environments is safe and feasible.

A 2009 cross-sectional study conducted in Gaborone, Botswana, compared the performance of nurse prescribers and physicians caring for HIV-infected pediatric patients. Selected by stratified random sampling, 100 physician and nurse prescriber encounters were retrospectively reviewed for successful documentation of eight separate clinically relevant variables: pill count charted; chief complaint listed; social history updated; disclosure reviewed; physical exam; laboratory testing; World Health Organization (WHO) staging documented; pediatric dosing. Nurse prescribers and physicians correctly documented 96.0% and 94.9% of the time, respectively. There was a trend towards a higher proportion of social history documentation by the nurses, but no significant difference in any other documentation items. Study findings support the continued investment in programs employing properly trained nurses in sub-Saharan Africa to provide quality care and ART services to HIV-infected children who are on therapy. Task shifting remains a promising strategy to scale up and sustain adult and pediatric ART more effectively, particularly where provider shortages threaten ART rollout.
In September 2005, a pilot program of nurse-centered antiretroviral treatment (ART) prescription was launched in three rural primary health centers in Rwanda. Three years later, a retrospective evaluation of the feasibility and effectiveness of this task-shifting model using descriptive data was performed. Results showed that the nurses achieved high compliance with national guidelines for ART eligibility and prescription, and had excellent patient outcomes. All prescriptions were consistent with national guidelines, except one. Of all the patients initiating ART, 90% of were alive at assessment.

Retrospective cohort analysis of 5357 adults and children commenced on ART between 2006 and 2008 in Lesotho showed that ART initiation and maintenance by nurses at the primary care level lead to a decrease (22.2% in 2006 to 11.9% in 2008) in the proportion of adults presenting sick (CD4 <50 cells/mm3). It was also observed that twelve-month outcomes were satisfactory in terms of mortality (11% for adults; 9% for children) and loss to follow up (8.8%). Also at 12 months, 80% of adults and 89% of children were alive and in care, meaning they were still taking their treatment. At 24 months, 77% of adults remained in care.

The huge impact of task shifting in providing access to HIV treatment has been illustrated in Malawi, where the national ART scale-up plan launched in 2004 involved non-physician clinicians providing ART. By September 2007, 130,488 patients had been started on ART at 154 health centers. Task shifting, coupled with a simplified and standardized public health approach and strong supervision, made it possible to scale up ART with acceptable quality standards resulting in many lives saved. Also, in Malawi, Lesotho and Lusikisiki, South Africa, nurses have initiated and managed ART at rural primary health clinics with support from mobile medical teams who provided clinical mentoring. This enabled access for patients who otherwise
might not have received the treatment they needed. When task shifting from doctors to nurses was reversed in Lusikisiki patient enrolment rates dropped precipitously.7

VIII. Conclusion

Task shifting when applied judiciously can serve as a beneficial healthcare delivery asset and not just a quick-fix solution to a workforce crisis. The approach has the potential to positively contribute to strengthening health systems overall7. It is very important that the country context be studied and vital areas of health workforce deficiencies identified. Tasks or roles that qualify for shifting will also need to be defined along with the appropriate cadre. Prior to delegation of tasks, cadres should be well trained for the specific task. It is also imperative to adopt a system of critical supervision once task shifting becomes operational as this will provide the necessary oversight required to maintain the integrity of the process. This basic prerequisites will ensure the longevity of quality oriented task shifting which will in turn contribute to the gradual scaling up of the health workforce in sub-Saharan African countries.6

All the literature reviewed in this paper consistently show that delegation of tasks, whether from doctors to non-physician clinicians, including nurses, from nurses to nursing assistants or aides or to non-professional or lay health workers can lead to improvements in access, coverage and quality of health services.28 Task shifting can also be very useful in the context of some SSA countries where the acceptability of certain types of health providers might be shaped by societal preferences in terms of age, gender, or professional experience. For example, women in some communities might prefer to receive care from other women rather than from men.
Reviewed literature show that task-shifting increases access to basic healthcare services as well as lifesaving interventions. For sustained effectiveness of task shifting in SSA, each country will need to determine the skill mix of health care workers that will best meet their national health priorities. The goal is simply to get the right workers with the right skills in the right places doing the right things. Identifying which tasks are currently completed by which type of worker, comparing this skill mix to the national priorities and determining if any needed tasks can be shifted, are necessary in planning for a strategic skill mix. Added tasks must be evidence-based to ensure the resulting services will improve health outcomes.28

All the literature reviewed in this paper strongly indicate that task shifting is a viable approach that improves health outcomes by increasing access to quality health care; optimizes skills of the health worker team to cope with growing patient loads; and increases retention. Its potential is continuously being underscored in the provision of contraceptive services, emergency obstetric services and more elaborately in HIV/AIDS management.

IX. Recommendations

Based on the reviewed literature this paper recommends that task shifting is a useful approach to meeting some of the health service demands posed by shortages in the health workforce of sub-Saharan Africa. For SSA countries that choose to adopt task shifting into their health workforce policies, it is recommended that the following barriers to task shifting be addressed if a quality and result oriented process is to be engendered.
Engaging with Regulatory Frameworks and Professional Bodies

Experience shows that task shifting may not be readily accepted by various professions and it is therefore recommended that coordination and consultation from the outset with key regulatory bodies such as medical and nursing councils, as well as with relevant government ministries (health, education, labor), are essential. For task shifting to be productive, it is necessary that there be formal recognition and acceptance of task shifting by physician professional societies.

Ensure high quality of care and safety

To ensure high quality task shifting, a training system that incorporates supervision, monitoring, and evaluation is recommended. Strong supportive supervision and continuous education are proven strategies for result oriented task shifting.

It is also recommended that a licensing or accreditation system that screens all the cadres involved in task shifting be created. This will ensure that health workers have the necessary skills and capacity for specific interventions and that these are maintained over time. This process legitimizes the cadre and ensures institutional responsibility for the performance of that particular cadre.

Ensure adequate recognition and remuneration

Giving lower cadres more responsibilities is unlikely to be sustainable unless adequate recognition and remuneration is provided. In Mozambique, training of técnicos de cirurgia was recognized by government and doctors who welcomed them as colleagues; Malawi, Zambia, and Tanzania also have well established cadres of surgical non-physician clinicians that are recognized formally and supported by the Ministries of Health. Poor salaries have been a key factor behind job dissatisfaction and the migration of doctors and nurses from sub-Saharan...
Africa to Western countries, where one in five nurses trained in sub-Saharan Africa currently work.\textsuperscript{29} It is therefore recommended that health workers be adequately recognized and compensated with a decent salary that constitutes a living wage and is commensurate with their responsibilities.\textsuperscript{29} Payment must therefore be linked to the level of responsibility and increasing workload associated with task shifting. If this is not taken into consideration it could affect the long-term viability of task shifting. In rural health facilities where tasks cannot be shifted to appropriate cadres because of severe deficiencies, incentive packages designed to attract health workers are highly recommended.\textsuperscript{29}

**Occupational health coverage of medical personnel**

Death from HIV/AIDS is a major contributor to healthcare worker shortages in sub-Saharan Africa. In Malawi it is estimated that over 10\% of all health workers had died of AIDS by 1997.\textsuperscript{29} Death from HIV/AIDS accounted for up to 40\% of all the attrition of nurses in Zambia and was the main reason for the attrition of health workers in Lesotho.\textsuperscript{29} It is recommended that all health workers involved in task shifting especially in HIV care have occupational health coverage that includes access to voluntary counselling and HIV testing services; post-HIV exposure prophylaxis, ART and TB care. These services should also be available to their families.

**Develop Adapted Guidelines**

Task shifting in HIV care has been supported by the development of standardized guidelines and protocols. It is recommended that standardized guidelines and protocols for specific tasks be developed for different cadres of health workers if task shifting is to be replicated in other specialties of healthcare delivery.\textsuperscript{30}
References


