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# Task Shifting To Nursing For A Sustainable Staffing Model Of School-Based Health Center In Under-Resourced Areas

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TASK SHIFTING TO NURSING FOR A SUSTAINABLE STAFFING MODEL OF  
SCHOOL-BASED HEALTH CENTER IN UNDER-RESOURCED AREAS


Submitted to the Faculty  
Yale University School of Nursing

In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Nursing Practice

Laura Lee Setliff Whittaker

May 18, 2015

The capstone is accepted in partial fulfillment of the requirements for the degree Doctor of Nursing Practice.

A handwritten signature in black ink that reads "Mark Lazenby". The signature is written in a cursive style with a horizontal line through the middle of the name.

James Mark Lazenby, PhD, APRN  
Assistant Professor

March 8, 2015

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Signed: Laura Lee Setliff Whittaker

May 18, 2015

## **ACKNOWLEDGEMENTS**

I would like to acknowledge Reverend Evalyn Wakhusama, Director of the Nambale Magnet School (NMS), who so graciously invited Bonnie Tong and I to visit and work with the school and its stakeholders to develop the framework for a SBHC at the Nambale Magnet School. The written capstone report will be provided to Reverend Wakhusama and key stakeholders at the school.

To Dr. Mark Lazenby, thank you for your support throughout this journey. Your insight and patience provided invaluable guidance for me throughout the process of completing the capstone. My committee members, Dr. Ruth McCorkle and Dr. Elizabeth Bradley, I thank you for believing in our project. To my partner and dear friend, Bonnie Tong, your encouragement and excitement will never be forgotten.

I would like to recognize my family - Don, Jonathan, Carolyn and Hanna Lee. Thank you all for the never-ending support that you provided to me along with understanding, and encouragement.

And finally, I am grateful to Dr. Donna Diers, who saw the value of nursing contributions in international health and encouraged me to move forward. Her words of wisdom will continue to inspire me throughout my career and life.

## ABSTRACT

**Background:** There is a well-established link between health and education (Bundy and Guyatt 1996). An efficient and cost effective way to increase access to care is through school-based services.

**Methods:** The purpose of this study is to develop a sustainable staffing model of a school-based health center in a country with limited health care resources. Two specific steps towards developing such a model are: (1) to critically review and analyze the evidence in the literature supporting an expanded nursing care practice model for the school-based health center, and (2) to merge the literature review findings with participatory field notes taken at a rural Kenyan school.

An integrative review was triangulated with observational field notes. Online databases were reviewed. Data from 17 articles was compiled into a summary table. Field notes and transcriptions of recordings were categorized by the following themes: identified stakeholders, local health needs, local health practice, and local health services. The findings from the review were triangulated with the findings from participatory field notes of informal discussions and governmental documents.

**Results:** The findings suggest equivalent outcomes between nurse-led care and physician-led care. Stakeholder involvement is key to addressing potential barriers. From these findings, a nurse-staffed, school-based health center model was developed, focusing on the nurse as the care provider. The nurse-staffing model identifies key institutional and governmental influences and their impact on the ability to achieve the goal of providing affordable, accessible, and acceptable quality health care for students in rural, under-resourced areas.

**Conclusion:** The evidence from the review supports the nurse-staffed, school-based health center model and deems it an effective strategy for offering high quality, cost effective care to children in under resourced areas.

**Keywords:** Nurse-led care, School-Based Health Center, Kenya, Nurse-Staffed, Literature Review

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## **Background**

There is a well-established link between health and education in the world today (Bundy and Guyatt, 1996). Educators and policy makers are becoming increasingly aware of the role of health in achieving educational goals. In addition, they are recognizing school health programs as social safety nets protecting some of the most vulnerable children and youth. (Grosh et al, 2008).

One of the most efficient and cost effective ways to reach the highest number of school-age children, especially in under-resourced areas, is by increasing access to health care through school-based health services (World Bank, 2003). With the inclusion of school health in the World Education Forum in Dakar, Senegal (UNESCO, 2000), school health programs are being established in low-income countries with great success. School health must be viewed not just as a health initiative, but also as a multi-sectorial approach to supporting the child.

School-based and school-linked health centers in the United States have consistently increased access to care, improved health outcomes, and increased school attendance and performance (Zimmerman, 2011) by providing a wide range of health interventions delivered by a nurse from a school platform. Services provided often include primary care, mental health counseling, dental care, education, illness prevention, and health promotion (School-Based Health Alliance, 2015).

However, school-based health centers (SBHC) remain underutilized and understudied in many countries, despite the evidence of the cost-effective health care outcomes in the United States. The question this paper explores is whether, in collaboration with the education sector, a school-based health center with a nurse as the primary provider can be established in under-resourced areas.

The overall purpose of this paper is to develop a sustainable staffing model of a school-based health center in a country with limited health care resources. Two specific methods towards developing this model are: (1) to critically review and analyze the evidence in literature supporting an expanded nursing care practice model for the school-based health center, and (2) to merge the literature review findings with participatory field notes taken at a rural Kenyan school.

## **Methods**

### **Design and Sample**

This study triangulates observational field notes (Bradley, Curry, & Devers, 2007) with an integrative literature review (Torraco, 2005) to develop a sustainable staffing model for a school-based health center at the Nambale Magnet School (NMS) in Nambale, Kenya.

Nambale is a rural region in western Kenya approximately 15 kilometers from the Ugandan boarder. The NMS is aligned with the Anglican Church and provides education and housing for 250 students, ranging from the age of 3 to the 6<sup>th</sup> grade. Financial support is received from several non-governmental organizations (NGOs) and student tuition, yet access to quality health care remains a barrier for the children of the NMS. The Nambale area is not adequately equipped with health care facilities, personnel, or supplies.

A visit was made to Nambale, Kenya, from February 10-13, 2014, and participatory field notes of informal discussions were audio recorded were kept. In addition, local, county, and federal governmental databases and reports were read and information was collected. Information categories included identified stakeholders, local health needs, local health practices, local health services, religious involvement, and community involvement. Swahili and English were the primary languages of the region and community nurses provided translation. A

systematic search of the literature was conducted using Medline, PubMed and SCOPUS and CINAHL databases between August 2014 and December 2014. The search strategy was comprised of the following search terms: “task shifting,” “nurse,” “non-physician,” “balance of care,” “sub-Saharan Africa,” “Kenya,” “HIV/AIDS,” “Randomized Control Trials” (RCTs), “service delivery,” “integration of tasks,” “health services accessibility,” “advanced practice nurses,” “non-communicable disease” (NCD) “pediatric task shifting,” “rural sub-Saharan Africa,” “nurse managed mental health,” “nurse-managed asthma,” “task shifting cost effectiveness,” “task shifting asthma,” “nurse-managed diabetes mellitus,” “nurse-managed communicable diseases,” and “nurse-managed malaria.” Electronic scanning identified relevant abstracts. The initial search yielded peer review articles, opinion papers, policy analyses, and position papers. Relevant studies related to task shifting were identified. Eligibility criteria for the literary evidence included having to be published in the English language between 11/2/1980 and 12/1/14; peer reviewed articles; community-based studies comparing physician care and nursing care; and located in Africa. Articles not related to nursing and task shifting in Africa were excluded. For this review, both RCT and observational studies were included. A meta-analysis was not performed.

## **Measures**

Data from the articles was recorded into a summary table containing general information including author, journal, publication date, country setting, study design, characteristics of participants, and sample size. Length of follow up and study finding were also included. Patient outcomes were evaluated and recorded.

Field notes and transcriptions of recordings were categorized by the following themes: identified stakeholders, local health needs, local health practices, local health services, religious

involvement, and community involvement.

### **Analytic Strategy**

Critical analysis of the literature involved examining the main ideas and relationships of issues related to school-based health clinics. First, main ideas were deconstructed into basic elements. Second, the main ideas were reconstructed conceptually for a clearer understanding. Third, the reconstructed main ideas were assessed for how they converged with, or diverged from, participatory field notes in order to adequately determine a model of an effective and sustainable school-based health center at NMS.

### **Results**

Seventeen articles were included in the integrative review (see Figure 1). Table 1 describes the 17 studies reviewed.

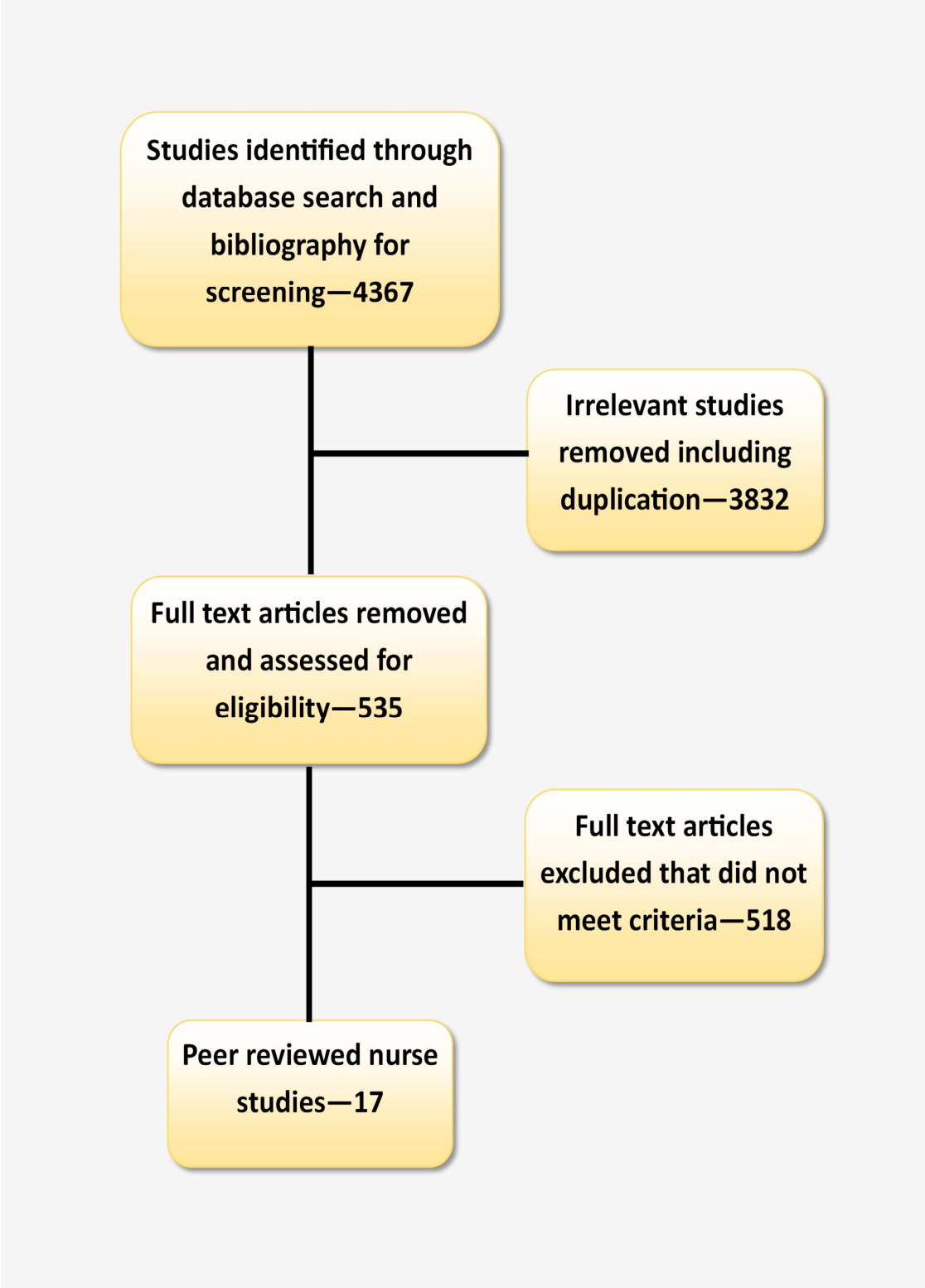


Figure 1. Literature Review Flow Chart.

**Table 1. Author(s), Journal & Year of Publication, Study Design, Sample, Length of Follow-Up, & Study Findings of Studies Included in Literature Review.**

Author(s)	Journal & Year	Country Settling	Study Design	Sample	Length of Follow Up	Study Findings/Conclusions	Comments
Coleman, Gill et al.	<i>World Health Bulletin</i> 1998	South Africa	Observational study. Nurse-led NCD services based on clinical protocols based on WHO.	Patients from areas served by village or mobile clinics. 68% hypertension, 82% with non-insulin dependent diabetes; 84% asthma.	2 years	Patient adherence increased from 79% to 87%. BP controlled in 68% of patients. Blood glucose controlled in diabetes	High attrition rate. The use of simple protocols and treatment strategies that were responsive to the local situation allowed a majority of patients to receive appropriate care at their local primary care facility.
Bedelu, Ford, et al.	<i>Journal of Infectious Diseases</i> 2007	Lusikisiki, South Africa,	Retrospective cohort.	Adults eligible for ART, CD4 count, 200 WHO clinical staging 4 cohort who have been receiving treatment for >12 months. 2200 people receiving ART in Lusikisiki in 2006 (95% coverage).	12 months	After 1 year outcomes were comparable in clinics and hospital. Outcomes data show that treatment can be initiated at the clinic level with satisfactory outcomes	
Kengne, et al.	<i>Elilepsia</i> 2008	Cameroon (Yaounde & Bafut)	Prospective non-randomized.	Baseline survey completed February 1998 - 66 patients were screened Additional 158 new patients added (n=224) median age : male (23.5 )female (22)	22 months	Supports the feasibility of protocol-driven nurse-led care for epilepsy in rural Cameroon. Reduction in number of monthly seizures.	Part of the UNHIP (Essential NCD Health Intervention Project ) with the overall goal of effective control and prevention of common NCD's , International guidelines were adapted for nurses.
Kengne, Awah, et al.	<i>The Journal of Clinical Hypertension</i> 2009	Cameroon (Yaounde & Bafut)	Observational Study.	Patients referred from field sample size: 454 patients registered in 5 clinics Random sampling between 11/1997 & 3/1998	26 months	Largest proportion of patients lost to follow up was between baseline and 3 <sup>rd</sup> clinic visit; study supports the use of nurses to improve access to primary care. The integration of hypertension and diabetes into primary care was feasible in terms of equipment and training, however low case detection rate and high attrition rates limited effectiveness of program.	



Author(s)	Journal & Year	Country Settling	Study Design	Sample	Length of Follow Up	Study Findings/Conclusions	Comments
Babigumira, Castelnuovo, et al.	<i>BMC Health Services Research</i> 2009	Uganda	Aggregate cost minimization model constructed and compared physician intensive follow up with nurse intensive follow up and pharmacy intensive follow up.	Participants from the Ugandan Infectious Disease Institute, HIV Clinic record review N=113	Follow up organized in 6 month time blocks, with 1 day time motion study on August 20,2007 of the 400 patents scheduled recording time in time out and calculated time spent with patient.	Primary outcome clinic attendance: participants receiving primary care-based treatment missed less appointments compared to hospital care. Task shifting resulted in substantial cost and physician timesavings.	
Berhanu, Alemu, et al.	<i>Seizure</i> 2009	Gondar, Ethiopia	Analysis/review of records of a nurse-led clinic established in 1998 and study published 2002 (seizures)	n=113 LTFU identified clinic clients	record review in 2001	113 patients were identified and traced. 28 (25%) died; 21 (19%) moved from area; 13 in remission; 44 experiencing seizures but receiving no treatment or see by traditional healers. 44% stated main reason for default is issues related to transportation.	
Labhardt, et al.	<i>BMC Health Services Research</i> 2010	Cameroon	Observational Study.	N=796 diabetic and hypertensive Patients.	24 months	High rate of LTFU lost to follow up (70.6%) Integration of care for HTN and Diabetes in nurse-led care suggests trained nurses can provide appropriate care. case detection was low	
Humphreys, Wright, Walley et al.	<i>BMC Health services Research</i> 2010	Lubombo, Swaziland	Prospective cohort and control cohort comparison. 11 clinics; Based on catchment area intervention focus group addressing satisfaction of care.	Sample size n= 353; 118 control and 235 intervention group; assignment of intervention /control clinics intervention focus group addressing satisfaction of care. Adults (aged over 14); clinically stable adults with CD4 count.100 and on retroviral treatment (ART) for at least 4 weeks Recruitment January 2007-June 2007	5-11 months	Patient outcomes: Patient satisfaction: 81% very satisfied; 13% satisfied; 3% dissatisfied and 3% very dissatisfied. Reasons for satisfaction included decrease in cost; shorter queue; better treatment; better care; reasons for dissatisfaction included staff arrived late and preferred to be seen at hospital. Outcomes in a primary health clinic are as good as, or better than the outcomes of similar patients who are maintained in at hospital-based ART clinic. Cost of treatment is lower across all outcomes and results in 11% cost reduction per patient year in care and only 5% of patients were lost to follow up.	
Sanne et al	<i>Lancet</i> 2010	South Africa	Parallel, cluster randomized trial 16 intervention, 15 controls groups.	Randomly assigned to 2 parallel groups n=15, 483 enrolled 2 cohorts. Cohort 1: adults 16 or older with CD4 count less than or equal to 350 and no ART. Cohort 2: adults 16 or older receiving ART for at least 6 months. Nurses received STRETCH training as part of the study.	12-18 months	There is no difference between patients initiated and followed by nurse when compared to physician care.	

Author(s)	Journal & Year	Country Setting	Study Design	Sample	Length of Follow Up	Study Findings/Conclusions	Comments
Labhardt, et al.	<i>Tropical Medicine and International Health</i> 2011	Central Cameroon	Cluster random controlled trial. Control group (group 1) no intervention; group 2- received incentives of 1 month free treatment every 4th month; group 3- reminder letters if appointments are missed; nurses received 4 hour training on treatment contract.	Adult patients newly diagnosed with uncomplicated hypertension and type 2 diabetes. (n=221)	1 year	No difference seen between BP or fasting trends between intervention group and control group. The difference in retention rates were significant between the two groups. Low cost intervention such as reminder and letters can improve retention	50% LTFU
Assefy, Kifli; Tekle, et al.	<i>Journal Health Services Res. Policy</i> 2012	Ethiopia	Retrospective cohort intervention: patients initiated and maintained at health centers by nurses and clinical health officers.	Study characteristics were not listed. Patients started on ART between September 2006 and August 2008 8 patient focus groups (n=57); one manager focus group (n=11); one health care provider (n=10)	Assessed at 6, 12 and 24 months.	After 12 months, an increase in mortality rate was noticed in task shifting group. Concern about study include high risk for data collection bias. Focus groups show that participants are satisfied with Nurse-led care.	
Kiweewa, Wabwire, et al.	<i>Journal of Acquired Immune Defic syndrome</i> 2013	Kampala Uganda	Randomized non-inferiority trial of ART initiated by physician seen at 2 and 12 months; by nurse at 2 weeks, 1,3,6,9 months. HIV-1 infected ART naive women randomized to nurse peer or doctor counselor.	Post-partum HIV women initiated on ART to prevent mother to child HIV transmission. >18 years; eligible for ART according to Ugandan ministry of health guidelines. n= 85 participants (45 intervention, 40 standard model )	Mean follow up 10 months ART initiation	No difference in care provided Nurses and physicians	
Long, Brennan, et al.	<i>PLOS Medicine</i> 2011	Johannesburg, South Africa	Observational study evaluating cost effectiveness of referral to primary care clinics.	Stable ART patients referred to a primary health clinic stable on ART > 11 months; undetectable viral load within the 10 months; CD4 (n=712) Patients matched to sample of eligible patients not transferred (n= 2136)	12 months	Outcomes of stable ART patients were as good, or better, than hospital-based care with a cost saving of 11% if pts. were not LTFU	
Monyatsi, Mullan, Phelps, et al.	<i>South African Medical Journal</i> 2011	Gaborone, Botswana	Cross-sectional study comparing nurse prescribers and physicians in a pediatric referral center.	100 physician encounters and 97 nurse prescriber encounters, Patient encounters selected by stratified random sampling.	Records reviewed between January-March 2009	Correct documentation was noted 96% of the time in nurse prescribers and 94.9% in physicians. Nurse-led ART care is not inferior to physician-led ART care.	
Fairall	<i>Lancet</i> 2012	South Africa	Pragmatic cluster randomized controlled trial 16 intervention group, 15 control groups.	Randomly assigned to 2 parallel groups n=15,483 enrolled 2 cohorts. Cohort 1: adults 16 or older with CD4 count less than or equal to 350 and no ART. Cohort 2: adults 16 or older receiving ART for at least 6 months	12-18 months	RTC support the expanded role of the nurse no non-inferior outcomes noted.	Training program: STRETCH program- "Streamlining Task and Roles to Expand Treatment and Care for HIV which provided educational outreach training

Author(s)	Journal & Year	Country Settling	Study Design	Sample	Length of Follow Up	Study Findings/Conclusions	Comments
Barton, Fairall et al.	<i>Tropical Medicine and International Health</i> 2013	South Africa	Cost-effectiveness analysis paired with a pragmatic cluster randomized controlled trial 16 intervention, 15 controls groups.	Randomly assigned to 2 parallel groups n=15,483 enrolled 2 cohorts. Cohort 1: adults 16 or older with CD4 count less than or equal to 350 and no ART. Cohort 2: adults 16 or older receiving ART for at least 6 months	12-18 months	The STRETCH intervention of nurse-led ART was associated with higher health service costs and. "The increased cost of nurse-led care could, however be accompanied by increased quality of ART."	of nurses it initiate and re-prescribable ART and to decentralize care."
Brennan, Long, et al.	<i>AIDS (London, England)</i> 2011	Johannesburg, South Africa	Retrospective cohort. Propensity scoring--matched cohort analysis Intervention: ART initiated at hospital by physicians and maintained at health centers by nurses every 2 months for medication pick up.	Ninety-three down-referred patients were matched to 2079 treatment-initiation patients.	12 months	Mortality may be lowering the task shifting group. Concerns about quality of data.	

The breakdown of the studies by country included South Africa (Coleman, 1998; Bedelu, 2007, Long, 2008; Fairall, 2012; Sanne, 2010; Brennan, 2011; Barton, 2013), Cameroon (Kengne, 2008; Kengne, 2009; Labhardt 2010; Labhardt, 2011), Ethiopia (Berhanu, 2009; Assefa, 2012), Uganda (Babigumira, 2009; Kiweewa, 2013), Swaziland (Humphreys, 2010), and Botswana (Monyatsi, 2011).

Six studies evaluated nurse-managed anti-retroviral therapy (Bedelu, 2007; Sanne, 2010, Humphreys, 2010, Kiweewa, 2013; Assefa, 2012; Brennan, 2013) with one study (Fairall, 2012) addressing nurses initiating and maintaining ART and one study reporting on ART pediatric management (Monyatsi, 2011). Three studies examined cost effectiveness (Babigumira, 2009; Long, 2011; Barton, 2013)

Six studies evaluated task shifting and non-communicable diseases. The study breakdown included one RCT (Labhardt, 2011) and five before and after studies. The before and after studies included asthma (Coleman, 1998;), epilepsy (Berhanu, 2009; Kengne, 2008), diabetes mellitus (Coleman 1998; Labhardt, 2010; Labhardt, 2011) and hypertension (Coleman 1998; Kengne, 2009; Labhardt, 2010; Labhardt, 2011).

Six broad themes were identified from the participatory field notes. These themes cohere with themes associated with task shifting that were identified from the literature.

## **Health Outcomes**

**Integrative literature review.** Twelve articles were selected for review relating to task shifting and health outcomes. Four RCT studies (Fairall 2012; Kiweewa 2013; Labhardt 2011 & Sanne 2010) and eight observational studies (Assefa 2012; Bedelu 2007; Brennan 2011; Berhanu 2009; Kengne 2008; Kengne 2009; Labhardt 2010 ;Coleman 1998) were reviewed.

*In the setting of HIV care.* Kiweewa (2013) and Sanne (2010) provided standard

training for staff and participants in the intervention and control group, whereas in the Fairall (2012) study design only the intervention group received training, called Streamlining Task and Roles to Expand Treatment and Care for HIV (STRETCH). Overall, the quality of evidence is high and supports the finding that there is no difference between mortality and loss to follow-up between nurse-led and physician-led care. Monyatsi (2011) recommends continued investment in programs that train nurses to provide care to stable children requiring antiretroviral treatment for HIV, thereby improving access to care.

In an observational study, Assefa (2012) found no difference in lost to follow-up (LTFU) between the physician group and nurse group, although an analysis of mortality at 12 months reported a slight increase in risk of death in the nurse task shifting group. Bedelu (2007) reported that task shifting increased access to care and decreased LTFU. In both studies the quality of evidence is considered low due to possible bias. In a retrospective ART cohort analysis, Brennan (2012) reported no difference in the nurse-led and physician-led groups; the quality of evidence is considered high. Overall, these studies support the findings that there is no significant clinical difference in outcomes between HIV patients who received care from physicians compared to those who received care from nurses.

***In the setting of care for NCDs.*** When looking at the expanding nurse role in caring for patients with non-communicable diseases, one RCT and seven before and after studies were reviewed.

*RCT.* Labhardt (2011) examined nurse-led care for hypertension and diabetes management and reported that low-cost interventions and nurse-led care can significantly improve retention rates in disease management in rural Africa. The quality of evidence is low due to attrition.

*Before and after studies.* Two studies (Berhanu 2008; Kengne 2008), which focused on epilepsy, reported that nurses can screen and treat patients as an alternative to physician-led care. Berhanu (2009) demonstrated the value of decentralized care at the community level. Kengne (2008) reported a downward trend in the number of days without a seizure and concluded that trained nurses can safely manage epilepsy in resource-limited areas.

One study focused on hypertension (Kengne 2009) and one focused on both hypertension and diabetes mellitus (Labhardt 2010). Kengne (2009) documented a significant reduction in BP levels and concluded that nurse-led care is an option in resource-limited areas. Labhardt (2010) reported the nurse's knowledge significantly improved care, with documented decrease in patients' blood pressure and blood glucose levels. Labhardt (2010) concluded that the trained nurse maybe provide a potential alternative in order to improve access to diabetic care in settings where physicians are limited. Even with methodological limitations, these studies demonstrate the positive impact of nurse-led care.

In a more comprehensive study, Coleman (1998) used simple protocols and treatment strategies for nurses to treat hypertension, asthma, and diabetes mellitus at a community clinic. The study demonstrated that trained nurses, with the help of treatment protocols, could effectively treat control patients with hypertension, diabetes and asthma.

These studies suggest that, with adequate training, protocols, and guidelines, nurses are able to screen and treat diseases with health outcomes that are similar to physicians.

**Participatory field notes.** Children at the NMS have many health needs. Deficits in specific nutrients, anemia, malaria, and infectious diseases are linked with school absences and learning disabilities (Bundy 2011). These preventable and treatable diseases can result in long-term effects on health, educational achievement and cognitive functioning if left untreated

(Bundy 20011).

A key stakeholder shared that the NMS continues to experience many health challenges ranging from malaria, asthma, sickle cell, typhoid, wound infections and accidents. Many students are HIV+ and suffer from complications associated with HIV. Generally the students are in poor health when they come to school.

The NMS staff realizes the link between health and educational performance. Thus, teachers are required to attend to children's health needs with little or no health care background or training. At best, school educators can administer basic first aid and painkillers. Occasionally anti-malarial medication will be administered. Injuries such as broken bones, accidents and illnesses that require emergency care often occur at the school. If a health center was located next to the school, it may result in better outcomes for the students.

Despite the existence of regulatory boards in Kenya, there is concern within the health care field that many unqualified practitioners are practicing in the private sector. Due to the limited health options in the area, families often seek care from traditional healers or unlicensed health care providers. This is a concern due to the questionable quality of care they receive.

### **Access to Care**

**Integrative literature review.** Nurse-led care and decentralized programs serve as effective and affordable options for improving access to health care. Bedelu (2007) reported that task shifted care increased health care access and LTFU was reduced when compared to hospital care.

**Participatory field notes.** The NMS has access to few health care resources. Many stakeholders shared the story of a resent student death that could have been prevented with better

access to care by qualified health care providers. A key stakeholder reported:

The nearest health center with medical staff to look after the children is a government center and often times has no stock of medication. The alternative is to buy medication or to travel to the district hospital, which is 15 miles away. Fifteen miles in Nambale is a long distance. Public transportation can be taken if one needs to save 5 minutes, which can be a matter of life or death.

Wide health disparities exist within Kenya and are closely linked to underlying socio-economic, gender, and geographic inequality and a severe shortage of health care workers. Kenya's health infrastructure faces the daunting challenge of delivering at least the minimum standard of health care for its 45 million citizens (CIA World Fact Book 2015). Currently in Kenya there are 0.18 physicians per 1,000 people, whereas the ratio of nurses is 128.3 per 100,000 people (Kenya National Board of Statistics). Forty-two percent of Kenya's population is under 14 years of age and that young population creates an additional burden on the country's already stressed health care infrastructure (CIA World Fact Book 2015). The severe shortage of health care workers is recognized as a major barrier to care. According to the World Health Organization (World Health Organization, 2012), having fewer than 2.3 health care workers (physicians, nurses, and midwives) per 100,000 people is insufficient to achieving adequate coverage of primary care.

### **Acceptability to the Community**

**Integrative literature review.** Humphrey (2010) and Assefa (2012) documented in focus groups that nurses were more supportive and generally well accepted by the community.

**Participatory field notes.** The NMS families and stakeholders viewed nurses as key in the delivery of health care within the region. The families of the students recognized the value of



a nurse-run, school-based health center within the community. They requested that the school consider providing nurse-led health coverage for the entire family.

### **Cost Effectiveness**

**Integrative literature review.** Three studies examined the cost effectiveness of shifting task from physicians to nurses (Babigumira 2009; Long; Barton, Fairall 2013). Babigumira (2009) estimated annual savings of \$1.51 million USD by using nurses instead of physicians, as well as 90 full-time equivalents (FTE) of physician personnel by instead using nurses to provided intensive follow up. The researcher did not include the cost of training, supervision, patient acuity, and startup cost. Long (2011) reported that nurse-led care in community clinics was as a good or better than hospital-based care and had a cost savings of 11%.

Unlike Babigumira (2009) and Long (2011), Barton and Fairall (2013) found nurse-led care was associated with higher health service cost compared to doctor-led care but reported that, “Given the shortage of doctors, further implementation of nurse-led ART should be considered”(p.777).

**Participatory field notes.** Kenya is a low-income nation with only 4.8% of its Gross Domestic Product (GDP) allocated for health care (Central Intelligence Agency World Fact Book, 2015). According to the Kenya Health Policy 2012-2030, the GDP of the country has improved and there is a decrease in the number of Kenyan’s living in absolute poverty, especially in urban areas. (Kenya Ministry of Health and Sanitation, 2012). Unfortunately, the absolute poverty level still remains high at 46% (Kenya Ministry of Health and Sanitation, 2012).

The Nambale poverty index is approximately 70-75%, which means that 70 to 75% of the Nambale population is living on the equivalent of 1 U.S. dollar per day. Families in the area

shared stories about the struggles of obtaining care in the local public clinic. Parents are required to take a day off from work and carry the children to the clinic and usually aren't able to get the necessary medical attention when they arrive anyway. A day of lost wages, the purchase of medications, and travel expenses can stress a family's budget, often resulting in parents choosing not to visit the clinic at all. Family members noted that the cost of a private clinic is prohibitive and often health visits are postponed due to the time requirement or cost. These choices ultimately impact the child's school performance. Meanwhile, many of the common health conditions that affect school age children require low-cost interventions and can be treated at the school level.

### **Stakeholder Involvement**

**Integrative literature review.** The private health sector in Kenya has dramatically expanded over the last two decades and stakeholders are an integral part of the public health arena. According to the World Bank (2011), Kenya's private sector is one of the most organized and developed in sub-Saharan Africa (World Bank 2011).

**Participatory field notes.** Stakeholders are an integral part of the public health arena, particularly in Kenya. Stakeholder alliances must be formed at the local, regional, national and international level that will in turn provide the needed support for the sustainability of the program. The identified major stakeholders at the NMS include educators, parents and family members, students, health care community providers, health facilities, community organizations, NGOs, and faith-based organizations.

### **Regulations**

**Integrative literature review.** Sanne (2010) reported that national restrictions on prescribing privileges may limit the expanse of task shifting responsibilities and recommended

reevaluating the scope of practices and national restrictions on prescribing privileges.

**Participatory field notes.** Within the last two decades, only 1,612 nurse were issued private practice licenses in Kenya (Kenya Nursing Workforce Report, 2012). Nurses are permitted to apply for private practice license after 3 years of practice, although the majority (97.9 %) of private practice licenses are issued to nurses with 10 or more years of practice experience (Kenya Nursing Workforce Report 2012). Eighty-five percent of the private practice licenses are given to certificate (enrolled) nurses and the remaining 15% to diploma nurses (Kenya Nursing Workforce Report 2012).

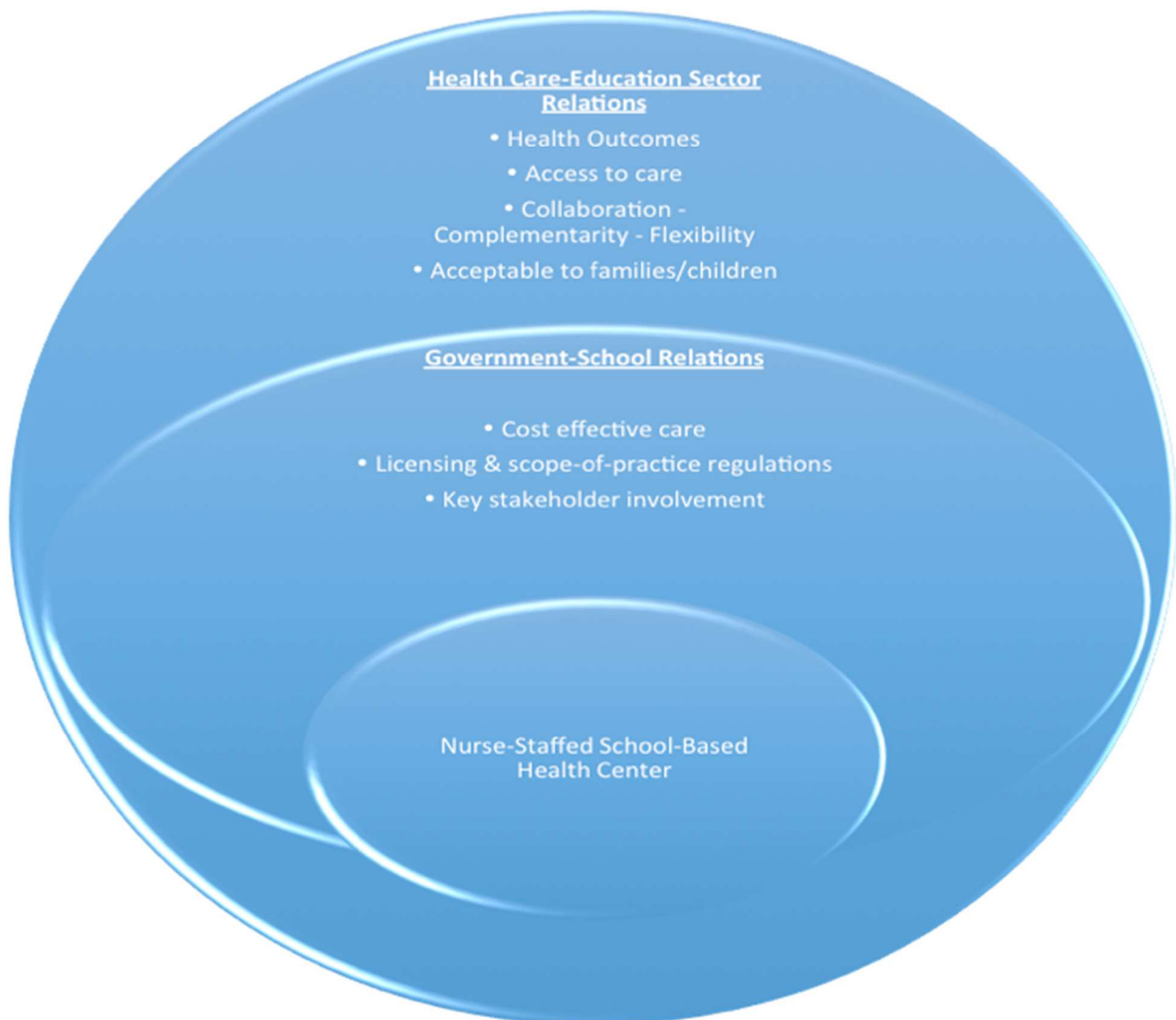
### **Discussion**

In this paper, we sought to develop a sustainable staffing model of a school-based health center in a country with limited health care resources by triangulating findings from an integrative literature review and findings from participatory field notes of informal discussions and governmental documents. The findings suggest that a nurse-run health center provides similar health outcomes as physician-led care; increases access to care; is acceptable; and is cost effective. Stakeholder involvement is key to success, while licensing and scope-of-practice regulations may be barriers.

### **Nurse-Staffing Model**

From these findings we have developed a school-based health center-staffing model that focuses on the nurse as the care provider (Figure 2). The model has an inner, representing the task-shifted staffing, and a middle and outer circle, each representing different levels of engagement with different communities.

**Figure 2. The Nurse-Staffed School-Based Health Center Model**



**Inner circle.** The inner circle represents task shifting to a nurse-led school-based health center.

**Middle circle.** The middle circle contains the themes that relate to policies at the governmental and school levels.

**Cost effectiveness.** The amount of expenditures greatly impact access to quality health care. In Kenya, policy makers must prioritize the use of scarce resources to address health disparities in the most cost effective manner. The results of this review suggest that shifting care from physicians to nurses is cost effective and, at the same time, increases access to care without compromising quality of care (Babigumira 2009; Long 2011; Fairall 2012; Sanne 2010).

**Regulations.** The scope of practice for Kenyan nurses is well developed and the parameters for private practice are clear (Kenya Nursing Workforce Report, 2012). Restrictive regulations and prescribing policies have been identified as regulatory barriers that adversely affect the ability of nurses to practice privately (Sanne 2010). The shifting of care from physicians to nurses will require an ongoing re-examination of current policies related to licensing, educational preparation, scope of practice, and regulatory requirements. According to McCarthy (2013), task shifting is not officially endorsed in Kenya, but does occur.

**Stakeholder involvement between school and government.** Identifying stakeholders and policy champions who support the goal of improving access to quality care for the students at schools is key to sustainability. Alliances and relationships must be formed and nurtured with all identified stakeholders. Moreover, the goal of the school-based health center must be compatible with the social norms, values, culture, and perceived needs of the stakeholders and the community. Consultation and support with all of the stakeholders is necessary to ensure the effectiveness of the proposed model.

**Outer circle.** The outer circle of the model addresses the importance of the relationship between the health care and the education sectors. Over several decades, research has validated the importance of the link between education and health (Grosh, et al., 2008). Successful school health programs are documented within the literature (Bundy 2009). The result is that school has become a venue for many health and social programs.

Overall, public health programs benefit greatly from the partnership between health care and education. Unfortunately, added program requirements may place an additional burden on the educational sector. To avoid conflict within the school setting, seven essential qualities have been identified that are necessary in order to build a strong partnership between the sectors and ultimately gain support for a school-based health center within the school community. They are:

**Health outcomes.** The analysis from the literature review supports the use of nurses as independent practitioners and concludes that there is no significant clinical difference between nurse-led care and physician-led care (Fairall 2012; Sanne 2010). School health programs have been shown to offer the greatest benefit to the poorest children (Bundy et al. 2009). Countries have successfully used school health programs to treat and to reduce the prevalence of schistosomiasis (Landoure, 2012; Njenga, Ng'ang'a, Mwanje, Bendera, & Bockarie, 2014), anemia (Seshadri & Gopaldas 1989; Soewondo, Husaina & Pollitt 1989), soil transmitting helminthes (Nokes et al. 1992; Grigorenico 2006), and malaria (Noor et al. 2009; Brooker et al. 2009). The treatment of infectious diseases and NCDs alike directly impacts school attendance and improves education outcomes (Bundy 2011).

**Access to care.** In countries with limited health care resources, a physician-based model of care is not always feasible. By shifting the traditional physician-led health services model to one allowing nurses to function independently, it is possible to make more efficient use of

resources and increase access to quality care. Task shifting serves as a springboard for recognizing and supporting the acceptance of the autonomous nurse. By delegating tasks traditionally performed by physicians to nurses, access to care is improved, while quality standards are maintained and cost is lowered (Sanne 2010, Fairall 2012).

***Collaboration between health center and school key stakeholders.*** Key to the sustainability of the school-based health center is that both educators and health care providers collaborate toward a common goal. Academic achievement has been associated with increased worker productivity and better adult health outcomes (Strauss and Thomas, 1995). For this reason, educators are under enormous pressure to produce academic results. Integrating academic achievement, attendance, behavior, and safety into health outcomes will strengthen the partnership between education and health. By using inputs from educators and collaboration between major stakeholders, a win-win solution occurs for both the educational and health sectors, as well as for students.

Two subset qualities of collaboration are complementarity and flexibility, which we have included in the outer circle of the model.

***Complementarity.*** Health care initiatives and educational goals must complement one another. It is important to recognize and understand the differences in culture and politics between the two sectors. By having a broader understanding of the demands, governance structure, and expectations of major stakeholders at various levels within the education sector, the school-based health center will be able to adapt and complement the ever-changing education environment.

***Flexibility.*** Although successful health strategies improve health outcomes, it is important to remember that sometimes goals for the educational profession differ from the public

health sector. Academic achievement is the top priority for the educational sector. Health care providers must be aware of the impact on classroom time when initiating a new health initiative. The health care provider must ensure that educational goals are not interrupted in order to meet the goals of the new health initiative.

*Acceptability to community.* There have been several changes to the Kenyan education sector within the last decade (Brookings Institute, 2013). Two key issues facing education in Kenya are free public elementary education and the emergence of low cost private schools. (Brookings Institute, 2013). Private schools provide more educational choices for children and, by paying for the child's schooling, parents are in a position of power. Parents have the ability to decide what is acceptable and what is not. The dynamics of private school education systems create market conditions for accountability. When parents pay for school services, schools answer to both the parents and the community. A positive feedback loop is created where acceptability is the impetus for accountability. If schools are judged by their ability to meet student achievement goals, educators and health care providers must work together toward the same goal of providing children with more opportunities and better quality of life.

### **Conclusions**

This integrative review includes RCT and observational studies. Although RCTs are considered the gold standard, the cost of RCT studies may be prohibitive, particularly in low-income countries. Therefore, the RCTs often require external funding sources, which may introduce a bias. Observational studies are also included in the review. The field notes validate the evidence and serve as the foundation for the nurse staffing model, although more rigorous studies are needed to validate the proposed model.

Several discussions in Nambale required translation from Swahili to English. A



professional translator was not used due to the cost. Community nurses provided translation, therefore the language challenges must be acknowledged. The field notes provide an understanding of the Nambale region only. The field notes strengthen the finding of the research, however they cannot be generalized to outside of the Nambale region.

Evidence from studies on task shifting in Africa demonstrates the success of nursing-led care. The studies have shown similar health outcomes between nurse-led and physician-led care. Access to cost effective care was improved, and patients and families found nurse-led care acceptable. Key stakeholder involvement is key to the sustainability of nurse-led school-based health centers, and licensing and scope-of-practice regulations must be addressed. Establishing a nurse-led school-based health center is an important and vital step towards closing the gap between health and education. Ultimately, the nurse-staffing model identifies key institutional and governmental influences that will help to achieve the goal of providing affordable, accessible, and acceptable quality health care for students in rural, under-resourced areas who so desperately need it.

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### **EDUCATION:**

**YALE UNIVERSITY**, New Haven, Connecticut 2012-2015

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**GEORGETOWN UNIVERSITY**. Washington, DC.

Certified Nurse Midwife, Nurse Midwifery Post Masters Program

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Business Management, Business Policy, Economics, and Accounting Courses.

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Master of Science,

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**Center for Disease Control and Prevention /AANC Fellowship** Atlanta, GA, present

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**International Health Coordinator / Quality Improvement Analyst**

Serves as a quality improvement nurse. Duties include monitoring international health care providers and health facilities, chart audits and designing measurement and evaluation health tools for compliance with Kate Puzey Peace Corps Volunteer Protection Act of 2011. Managed medical evacuations and provided health care, field consults, and case management for volunteers worldwide, including after-hour emergencies. Served as a health care provider during four Peace Corps evacuation and transition conferences in Mauritania (8/09), Guinea (10/09), Kazakhstan (11/11) and Ukraine. Duties during the evacuation duties included close of service physical examinations and treatment of acute and chronic health problems of the Volunteers. Conducted quality improvement site assessments for health units in Benin, Kyrgyz's Republic, Kazakhstan, Micronesia/Palau, Ghana, and Ecuador. Served on Department of State medical team to assess the health services provided to contractors in Iraq (7/12). Evaluated medical eligibility of Peace Corps applicants to serve overseas, and participate in medical clearance issues. Office of Victim Advocacy-served as victim advocate providing support for victims of sexual assault. Completed Victim Advocacy Certificate Course through Virginia Polytechnic Institute. Annual participated/presentation in continuing medical education (CME) for Peace Corps Medical Officers (PCMO). Serves of Clinical Care Committee, Sentinel Event Committee, PCMO Credentialing Committee. Special Interest: counterfeit medication.

**BALTIMORE CITY HEALTH DEPARTMENT**, 1995 - 2009

**Family Nurse Practitioner / School Based Health Center.**

Provided primary health care for students in school-based clinics. Experience included assessment, diagnosis, and the treatment of uncomplicated acute and chronic health problems. Performed annual examinations, pediatric examinations, sports physicals and pre-employment



examinations. Provided birth control options, health education, and case management. Other responsibilities include development of community programs addressing the identified needs of the urban youth. Presented individual and group health education programs including nutrition, health promotion and injury prevention. Completed “Clinic Manager Disaster Training” with the Baltimore City Office of Public Health Preparedness and Response. Served on Quality Improvement Committee. Acted as health care provider for the Narcan Education Program. Completed Clinical Research Certificate Program- Georgetown University School of Nursing (2000). Mayor Recognition for Service to Community.

**MARYLAND GENERAL HOSPITAL, Baltimore, MD.**

**Utilization Review/Case Management**

Reviewed medical records and evaluated appropriateness of patient hospitalization, transmitted information to third party payers, and collaborated with health care providers concerning hospitalization. Coordinated and planned for patients during hospital discharge process.

**CITY SPRINGS WELLNESS CENTER (BCHD). Baltimore, MD..**

**Family Nurse Practitioner**

Assisted in establishing a multi-disciplinary wellness center at City Springs Elementary School. Conducted needs analysis of identified target population, developed mission statement, working objectives, policy and procedure manual. Assisted parents and families in the identification and utilization of community resources. Provided in-service programs for faculty, staff, and parents of students. Performed physical exams for students and families and provided treatment for acute and chronic health problems.

**SHANDS HOSPITAL / UNIVERSITY OF FLORIDA. Gainesville, FL.**

**Educational Instructor - Maternal / Child Division in the Department of Nursing.**

Directed a task force responsible for the planning and presentation of maternal / child health workshops and in-service programs. Served as the direct liaison between department and other health care professionals throughout the institution. Instrumental in the design and implementation of various self-paced educational programs focusing upon specific patient care issues. Served as a member of the Nursing Quality Assurance Committee and Policy Update Committee. Active member of the Standard Competency Evaluation Committee.

**UNIVERSITY OF CHARLESTON. Charleston, WV.**

**Nursing Instructor - Maternal / Child Health in the School of Nursing.**

Supervised, counseled, and evaluated students during their classroom and clinical training experiences. Participated in course development and revisions of curriculum. Assisted in the writing of a departmental self study program for the State / NLN accreditation process.

**MEDICAL COLLEGE OF VIRGINIA HOSPITALS.** Richmond, VA

**Nurse Clinician** - Medical Floor.

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**Danville Free Clinic.** Danville, VA. Board Member. 1993 to 1994.

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