



# Identifying the Gaps: An Assessment of Nurses' Training, Competency, and Practice in HIV Care and Treatment in Kenya

Janel Smith, MPH, RN\*

Doris N. Odera, MPH, BSc

Duncan Chege, PhD

Esther N. Muigai, BSc

Padmaja Patnaik, PhD, MS

Susan Michaels-Strasser, PhD, MPH, MSc, RN, FAAN

Andrea A. Howard, MD, MS

Janette Yu-Shears, MSN, RN

Jennifer Dohrn, DNP, CNM, FAAN

*Given the burden of HIV and the critical shortage of health workers in Kenya, in 2011 the National AIDS and STI Control Program recommended shifting HIV care and treatment tasks to nurses in settings without physicians and clinical officers in order to decentralize and scale-up HIV services. In September 2013, ICAP at Columbia University conducted a survey with nurses in four health facilities in eastern Kenya to assess preparedness for task shifting. Findings indicated gaps in nurses' training, perceived competency, and practice in HIV care and treatment. Further investment in nurse capacity building is needed to bridge the gaps and prepare more nurses to provide high-quality, comprehensive HIV care and treatment services to curb the epidemic in Kenya.*

(Journal of the Association of Nurses in AIDS Care, 27, 322-330) Copyright © 2016 The Authors. Published by Elsevier Inc. on behalf of Association of Nurses in AIDS Care. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Key words:** Africa, competency, HIV, nurse initiated and managed antiretroviral treatment (NIMART), task shifting, training

*Janel Smith, MPH, RN, is a Nursing Training and Education Officer, ICAP, Columbia University, Mailman School of Public Health, New York, New York, USA. (\*Correspondence to: [js4308@columbia.edu](mailto:js4308@columbia.edu)). Doris N. Odera, MPH, BSc, is a Capacity Building Advisor, ICAP, Columbia University, Nairobi, Kenya. Duncan Chege, PhD, is the Director of Monitoring, Evaluation and Research, ICAP, Columbia University, Nairobi, Kenya. Esther N. Muigai, BSc, is the General Nursing Capacity Building Coordinator, ICAP, Columbia University, Nairobi, Kenya. Padmaja Patnaik, PhD, MS, is an Epidemiologist, ICAP, Columbia University, Mailman School of Public Health, New York, New York, USA. Susan Michaels-Strasser, PhD, MPH, MSc, RN, FAAN, is the Senior Implementation Director, Associate Director for Nursing Programs, ICAP, Columbia University, Mailman School of Public Health, New York, New York, USA. Andrea A. Howard, MD, MS, is the Clinical & Training Unit Director, ICAP, the Program Director, Global HIV Implementation Science Research Training Fellowship, an Associate Professor of Epidemiology, Columbia University Medical Center, Mailman School of Public Health, Columbia University, New York, New York, USA. Janette Yu-Shears, MSN, RN, is a Public Health Analyst, Global Health Systems Branch, Division of Training and Capacity Development, HIV/AIDS Bureau, Health Resources and Services Administration, U.S. Department of Health and Human Services, Rockville, Maryland, USA. Jennifer Dohrn, DNP, CNM, FAAN, is an Assistant Professor of Nursing, Columbia University Medical Center, and the Director, Office of Global Initiatives and WHO Collaborating Center for Advanced Practice Nursing, School of Nursing, Columbia University, New York, New York, USA.*

A critical shortage in the health workforce hinders access to HIV care and treatment in Kenya. In 2013, 1.6 million people were living with HIV in Kenya, and the number needing treatment increased by more than 300,000 from 2009 to 2013, stretching the national health system's resources and leaving 21% of eligible adults and 57% of eligible children without treatment (United Nations Joint Programme on HIV/AIDS, 2014b). Treatment depends on having enough trained health workers, and with a national average of 0.19 physicians and 0.86 nurses per 1,000 population, Kenya falls short of the World Health Organization (WHO) minimum standard of 2.3 per 1,000 population (WHO, 2013). Because physicians are especially scarce, particularly in remote and rural areas, nurses provide the large majority of primary health care services and are the first-line responders to a wide array of health issues, including HIV.

Recognizing the health workforce shortage and the significant role of nurses in responding to HIV, the Health Resources and Services Administration (HRSA), a U.S. Government agency participating in the United States Presidents' Emergency Plan for AIDS Relief (PEPFAR), conceptualized the Global Nurse Capacity Building Program (GNCBP). The GNCBP began in 2009 with the aim to strengthen the quantity, quality, and relevance of nurses in sub-Saharan Africa. A key objective of the program is to develop and enhance nurses' roles in HIV service delivery through task shifting. Task shifting from physicians to nurses can make better use of limited human resources to expand access to HIV care and treatment. In 2008, WHO published *Task-Shifting Global Recommendations and Guidelines*, endorsing nurses' practices in HIV care and treatment tasks, such as nurse-initiated and managed antiretroviral treatment (NIMART), including: (a) preparing patients for antiretroviral treatment (ART), (b) determining medical eligibility, (c) prescribing first-line ART, (d) clinical monitoring, and (e) managing side effects (WHO, 2008). Evidence from the sub-Saharan African region has shown NIMART to be effective in producing favorable patient outcomes, to be comparable to care provided by physicians, and to have contributed to an increase in ART uptake (Fairall et al., 2012; Georgeu et al.,

2012; Nyasulu, Muchiri, Mazwi, & Ratshefola, 2012; Sanne et al., 2010). Conversely, a shortage of NIMART-trained and -mentored nursing staff has resulted in sub-optimal outcomes in some areas, particularly pediatric ART initiation (Cameron, Gerber, Mbatha, Mutyabule, & Swart, 2012).

Although NIMART is effective and is increasingly practiced and included in policy across sub-Saharan Africa, it has not always been reinforced by nursing regulation nor adequately incorporated into education and training curricula (Zuber, McCarthy, Verani, Msidi, & Johnson, 2014). NIMART was adopted as national policy in Kenya in 2011 with the release of the National AIDS and Sexually Transmitted Infection (STI) Control Program (NAS COP), *Guidelines for Antiretroviral Drug Therapy in Kenya* (National AIDS and STI Control Programme, 2011). However, the extent of nurses' training and competency to function within this expanded scope of practice for HIV service delivery has not been well documented.

The objective of our study, therefore, was to describe the current status of nurses' training, perceived competency, and practice in HIV care and treatment, in order to inform the development of a NIMART training and mentorship program to increase the number of nurses able to provide high-quality HIV care and treatment for effective decentralization and scale-up of HIV service delivery in Kenya.

## Methods

A cross-sectional study design was used to survey the target population in September 2013. A purposive sample of nurses practicing in four government health facilities supported by ICAP at Columbia University in the Eastern region of Kenya was recruited. Study sites, which included Kitui District Hospital, Makindu District Hospital, Mtito Andei Health Center, and Athi River Health Center, were purposively selected based on a demonstrated need for NIMART due to high HIV-patient volumes and a shortage of clinical officers and physicians. There were 2,385 HIV-infected clients enrolled in care across study sites during the month of the survey, and two of the four facilities were entirely nurse operated, with no clinical officers or physicians on site.

All nurses employed at the study sites were invited to participate in the study. Of the 180 nurses employed at the four facilities, 165 (92%) provided written informed consent before enrolling in the study, 14 were unavailable at the time of data collection, and one declined to participate.

Data were collected using a structured self-administered paper-based questionnaire. The questionnaire included a list of more than 200 nursing tasks for HIV care and treatment as defined by WHO (2008) in areas such as: (a) HIV prevention, (b) HIV clinical management, (c) NIMART, (d) prevention of mother-to-child transmission (PMTCT), and (e) pediatric HIV care and treatment. For each task item, a 4-point Likert scale was used to measure nurses' training (0 = none; 1 = in-service training, 2 = preservice training, and 3 = both preservice and in-service training), perceived competency (0 = cannot perform, 1 = cannot perform without supervision, 2 = can perform independently, and 3 = can perform independently and instruct others), and practice frequency (0 = never, 1 = monthly, 2 = weekly, and 3 = daily). The questionnaire was reviewed by nursing and clinical experts in HIV care and treatment at ICAP, the U.S. Centers for Disease Control and Prevention, WHO, and the Ministry of Health in Kenya. The questionnaire was finalized after pretesting with 10 practicing nurses in a Kenyan health facility not included in the study. Prior to implementation, the Columbia University Medical Center Institutional Review Board and the Kenya Medical Research Institute Institutional Review Board approved the study protocol and survey instrument.

Consenting participants completed questionnaires after receiving instructions on questionnaire completion from the study staff. Two data entry clerks double-entered completed questionnaires into an Excel database (Microsoft Corporation, Redmond, WA). Any discrepancies arising from the double data entry of the questionnaires were resolved by reviewing the source documents.

Descriptive statistical analyses were conducted using Microsoft Excel (Microsoft, 2010). Data were categorized dichotomously for training (1 = trained [in-service, preservice, or both in-service and preservice training received]; 0 = not trained [no training received]), competency (1 = competent [can perform

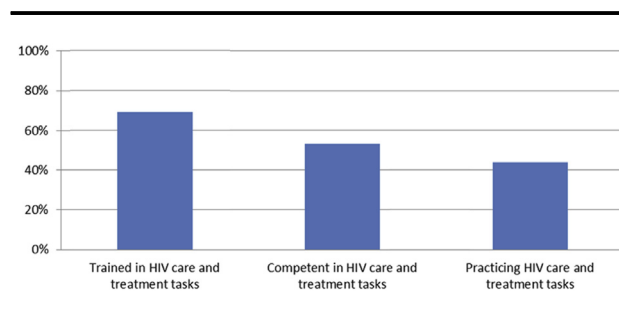
independently or can perform independently and instruct others], 0 = not competent [cannot perform or cannot perform without supervision]), and practice (1 = practicing [practiced daily, weekly, or monthly], 0 = not practicing [never practiced]). Frequencies were calculated on dichotomous categorical data to determine the percentage of nurses trained, competent, and practicing each task.

## Results

Among surveyed nurses ( $N = 165$ ), more than two-thirds reported having been trained in HIV care and treatment (69%,  $n = 114$ ), but fewer felt competent (53%,  $n = 87$ ) and even fewer were practicing (44%,  $n = 73$ ), representing a cascade of gaps in nurse capacity building (Figure 1). The percentage of nurses who reported being trained, competent, and practicing HIV care and treatment tasks are reported in five categories: HIV prevention, HIV clinical management, NIMART, PMTCT, and Pediatric HIV (Table 1).

### HIV Prevention

The majority of respondents were trained in HIV testing and counseling and patient education, but not all who had been trained felt competent or were practicing those tasks. Fewer nurses had been trained to provide postexposure prophylaxis or male circumcision, and fewer than one-third had practiced the interventions.



**Figure 1. Percentage of nurses reported to be trained, competent, and practicing HIV care and treatment tasks ( $N = 165$ ).**

**Table 1.** Percentage of nurses who reported to be trained, competent, and practicing HIV care and treatment tasks by category (N = 165).

HIV Care and Treatment Tasks by Category	Trained	Competent	Practicing
HIV prevention			
Educate on HIV prevention	91%	79%	69%
Conduct HIV testing and counseling	91%	79%	70%
Provide postexposure prophylaxis	66%	46%	33%
Perform male circumcision	55%	42%	29%
HIV clinical management			
Conduct clinical staging	82%	57%	71%
Provide co-trimoxazole prophylaxis	73%	64%	54%
Provide isoniazid prophylaxis	47%	30%	22%
Initiate tuberculosis treatment	64%	45%	32%
Monitor tuberculosis treatment response	77%	58%	48%
Nurse initiated and managed ART			
Prepare patients for ART	76%	62%	55%
Determine medical eligibility	66%	42%	39%
Prescribe first-line ART	44%	27%	24%
Monitor and support adherence to ART	69%	60%	43%
Identify treatment failure	58%	33%	36%
Manage side effects	67%	40%	35%
Prevention of mother-to-child transmission			
Counsel on family planning	94%	87%	71%
Prescribe ART for pregnant woman	58%	38%	27%
Provide antiretroviral prophylaxis to neonate	73%	58%	49%
Provide co-trimoxazole prophylaxis to neonate	72%	58%	48%
Conduct HIV testing for infant diagnosis	60%	42%	30%
Pediatric HIV			
Conduct HIV testing for child	70%	57%	41%
Provide co-trimoxazole prophylaxis to child	80%	64%	48%
Provide counseling to child and caregiver	79%	68%	58%
Prescribe first-line ART for child	48%	37%	27%
Monitor and support adherence to ART for child	61%	50%	47%

Note. ART = antiretroviral treatment.

## HIV Clinical Management

More nurses were trained to manage than to initiate tuberculosis treatment or isoniazid prophylaxis, and less than one-third felt competent or had practiced initiating treatment. While the majority of nurses were trained to conduct clinical staging and provide co-trimoxazole prophylaxis, only about half felt competent and were practicing these interventions.

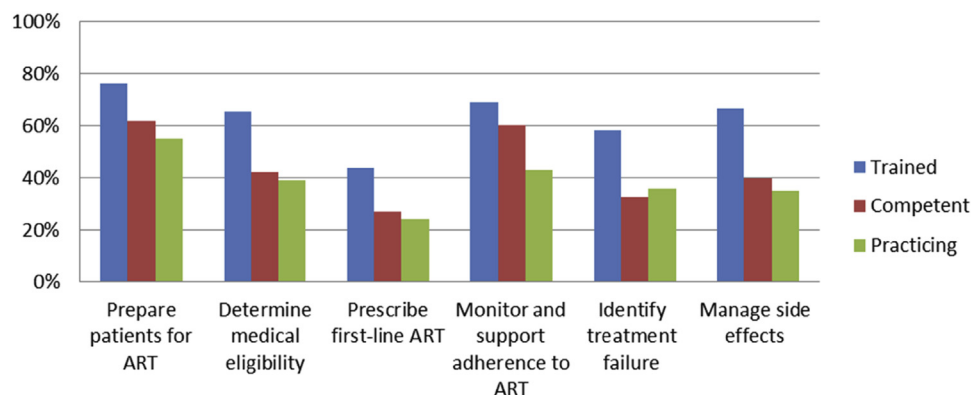
## Nurse Initiated and Managed ART (NIMART)

Gaps existed in nurses' training, competency, and practice in NIMART, particularly in treatment initiation (Figure 2). Fewer than half were trained, less than a third felt competent, and less than a quarter were

practicing prescribing ART. Gaps were also noted in ART management, as fewer than half felt competent or had practiced monitoring and supporting adherence to ART and managing side effects, and less than one-third felt competent or had practiced identifying treatment failure through viral load monitoring.

## Prevention of Mother-to-Child Transmission (PMTCT)

While the majority of nurses were trained, competent, and practicing family planning counseling, only half were trained and less than a third felt competent or had practiced prescribing ART for an HIV-infected pregnant woman. Similar gaps were found in care for the HIV-exposed infant. Less than one-third were



**Figure 2.** Percentage of nurses who reported to be trained, competent, and practicing nurse-initiated and managed antiretroviral treatment ( $N = 165$ ). *Note.* ART = antiretroviral treatment.

practicing conducting HIV testing for early infant diagnosis, and about half reported competence and practice providing antiretroviral and co-trimoxazole prophylaxis to the HIV-exposed infant.

### Pediatric HIV

Although most nurses were trained and half felt competent and had practiced managing a child on ART, fewer were trained, and only one-quarter were practicing initiating ART for a child. Fewer than half of the nurses were conducting HIV testing and counseling and providing co-trimoxazole prophylaxis to eligible children, although the majority had been trained.

### Discussion

In our cross-sectional study of nurses working at health facilities in eastern Kenya, a cascade of gaps emerged between HIV nursing policy, training, competency, and practice. Although Kenyan policy recommended task shifting (*National AIDS and STI Control Programme, 2011*), not all nurses had been trained. Of those trained, not all were competent. Finally, of those who were competent, not all were practicing. Findings indicated a need to examine each step along the nurse capacity-building cascade, from policy to training, training to competency, and competency to practice, in order to identify barriers and opportunities to bridge the gaps.

### Policy to Training Gap

Our survey identified a significant gap between policy and training. Although WHO and Kenya national guidelines recommended task shifting in places where shortages of clinical officers and physicians existed (*National AIDS and STI Control Programme, 2011; WHO, 2008*), one-third of nurses working in health facilities with shortages of clinicians at the time of the study had not been trained in comprehensive HIV care and treatment, and more than half had not been trained to prescribe first-line ART. These findings were consistent with other studies from the region, which have shown NIMART to be increasingly promoted through national guidelines yet inadequately incorporated into education and training (*McCarthy et al., 2013; Zuber et al., 2014*). For example, a study from east, central, and southern Africa found that 8 of 15 countries surveyed had formally authorized NIMART as a policy, but only three of those countries had incorporated NIMART into the national preservice nursing education programs (*Zuber et al., 2014*). Without enough NIMART-trained nurses, the national task-shifting policy cannot be realized, and scale-up of HIV service delivery will be limited. Studies in the region have shown that shortages of NIMART-trained nursing staff have led to sub-optimal outcomes in some areas, particularly pediatric ART initiation (*Cameron et al., 2012*). Despite nurses' critical roles in ART service



provision and increasing access to care, investment in NIMART-training and nurse capacity building more generally remains grossly under-funded. In 2013, only 1% of HIV spending in Kenya went to human resource development (U.N. Joint Programme on HIV/AIDS, 2014b), a situation that permeated the region where nurses remained the primary providers of care.

Following our assessment, ICAP Kenya GNCBP through PEPFAR/HRSA began working closely with the Ministry of Health and key stakeholders to address the policy-training gap by providing NIMART in-service training to 150 practicing nurses in four health facilities in eastern Kenya between April 2014 and June 2015. Education was provided using a training-of-trainers approach to deliver the national integrated HIV e-learning course developed by NASCOP in 2013.

Further investment in national scale-up of NIMART in-service training is critical to ensure that nurses are prepared to provide comprehensive HIV care and treatment services in a task-shifting setting in accordance with national policy in Kenya. Additionally, preservice education should be reviewed and updated to ensure that core competencies, training content, teaching and learning methods, and assessment methods include the essential HIV care and treatment tasks as defined by WHO and Kenya national guidelines (National AIDS and STI Control Programme, 2011; WHO, 2008).

### Training to Competency Gap

A gap was also noted between training and the self-perceived competency of nurses in HIV care and treatment. Although the majority of nurses had been trained in HIV care and treatment tasks, only about half felt competent to perform those tasks. These findings suggest that training alone has not been sufficient to ensure self-perceived HIV competency in nurses in Kenya. Evaluation of countries providing NIMART education and training in the east, central, and southern Africa region have identified several challenges to training: lack of accreditation or approval by professional regulatory bodies and subsequent lack of assurance of standards, including inadequate training time and

methods, including practical mentorship (Zuber et al., 2014).

After our study was conducted, ICAP Kenya GNCBP established a NIMART Mentorship program to promote competency in NIMART trained nurses. An *HIV Care and Treatment Mentoring Guide* was developed by ICAP Kenya GNCBP in collaboration with key stakeholders in February 2014 and was adapted from the *ICAP Campus to Clinic Mentorship Guide*, developed in South Africa in 2010 to train nurse mentors to prepare new graduates for full-scope HIV clinical practice (ICAP, Columbia University, 2010). Using the Mentorship Guide, ICAP Kenya GNCBP trained 87 nurses and clinical officers as NIMART mentors and established and equipped two health facilities in eastern Kenya as NIMART Model Centers between April 2014 and June 2015. Nurses from surrounding facilities visit the centers of excellence for mentorship on HIV management and best ART prescribing practices. The centers have been equipped with computers and training materials to facilitate e-learning.

Follow-up evaluation of ICAP Kenya GNCBP NIMART training and mentorship is necessary to assess outcomes and identify need for improvement to ensure that training and mentorship result in nurses who achieve and maintain competency in HIV care and treatment. Following evaluation of the pilot program, scale-up of NIMART mentorship and NIMART model centers beyond eastern Kenya will be needed to ensure national coverage of NIMART prepared nurses. Furthermore, use of innovative resources, such as e-learning, should be explored to ensure that trained and mentored NIMART nurses maintain competency and remain up to date with the latest care and treatment guidelines. ICAP GNCBP, through PEPFAR/HRSA, released the Option B+ e-learning module to train nurses and midwives in the latest approach to PMTCT in 2014 (ICAP, Columbia University, 2014) and collaborated with the East, Central, and Southern Africa College of Nursing (ECSACON) to host the e-learning module on the ECSACON CPD (continuing professional development) library (ECSACON, 2014). ICAP is currently working through the Centers for Disease Control and Prevention to develop a complementary pediatric HIV care

and treatment e-learning module, which will be available in 2016.

### Competency to Practice Gap

A final gap was noted between self-perceived competency and reported practice of tasks pertaining to HIV care and treatment. Although half of the nurses reported feeling competent in HIV care and treatment, 10% fewer were actually practicing comprehensive HIV care and treatment, and less than a quarter were prescribing first-line ART. Findings suggest that certain barriers prevented trained nurses who felt competent from providing a full scope of practice for HIV care and treatment in Kenya. Barriers to complete implementation of NIMART in the sub-Saharan African region have included an increased workload for nurses, lack of additional compensation for duties performed, gaps in collaboration and coordination in the health team, and initial resistance by regulatory bodies (Zuber et al., 2014). A survey in east, central, and southern Africa showed that the majority of countries in the region had not integrated NIMART into nursing scopes of practice or other regulations (Zuber et al., 2014). Another study in 13 countries in the east, central, and southern African region showed only one country had assessed NIMART competencies in a national credentialing examination, and only two countries required continuing professional development in NIMART for re-licensure (McCarthy et al., 2013).

In April 2015, ICAP Kenya GNCBP, through PEP-FAR/HRSA, began work to bridge the competency-to-practice gap through a quality-improvement initiative to increase nurse initiation of ART for HIV-infected pregnant and breastfeeding women in two sites in Kisumu, Kenya.

Further investment to advance regulation and quality assurance to support NIMART is needed to ensure a full scope of practice for nurses in HIV care and treatment services in Kenya. WHO *Task Shifting Global Recommendations and Guidelines* recommend comprehensive support for NIMART through education, training, and mentorship, as well as regulation and quality assurance, such as nursing standards of practice, credentialing, and continuing professional development (WHO, 2008).

### Limitations

We evaluated a limited sample of nurses practicing in four facilities in the eastern region of Kenya, and findings, therefore, may not be generalizable across the country. Measurement of nurses' training, competency, and practice was obtained through self-report and may have been prone to reporting and recall bias. Validation of findings through an objective measure, such as direct observation of nurses' competency and practice, would be helpful.

### Strengths

While other studies in the region have evaluated nurses' training and practice in NIMART generally (Zuber et al., 2014), our study is the only one, to our knowledge, that provides a detailed look at nurses' training, perceived competency, and practice in a list of specific HIV care and treatment tasks as defined by WHO *Task Shifting Global Recommendations and Guidelines* (WHO, 2008).

### Conclusions

More investment in nurse capacity building is critical to ensure that all nurses are prepared to provide comprehensive HIV care and treatment services in accordance with national policy both in Kenya and throughout the region, where nurses remain the mainstay of HIV service delivery. As past President of the Association of Nurses in AIDS Care, Dr. Lucy Bradley-Springer explained, "Every nurse is an HIV nurse." Preservice education and in-service training must be updated to ensure that core competencies, training content, teaching and learning methods, and assessment methods include essential HIV care and treatment competencies as defined by WHO *Task Shifting Global Recommendations and Guidelines* and the NASCOP *Guidelines for Antiretroviral Drug Therapy in Kenya* (NASCOP, 2011; WHO, 2008).

As Kenya aims to expand access to HIV services, including ART, for all HIV-infected individuals, the need for NIMART will increase rapidly. The need is echoed throughout the region as increasingly ambitious targets for equitable access to lifesaving HIV

treatment for adults and children are set in global guidelines (United Nations Joint Programme on HIV/AIDS, 2014a). Further investment in nurse training and mentorship, as well as enabling legislation, professional regulation, and quality assurance, are needed to bridge the gap and build the capacity of all nurses to provide quality HIV services. Without more nurses who can provide NIMART, Kenya will not likely achieve ART coverage goals critical for curbing the HIV epidemic.

### Disclosures

The authors report no real or perceived vested interests that relate to this article that could be construed as a conflict of interest.

### Key Considerations

- **Training:** Further investment in national scale-up of nurse-initiated and managed antiretroviral therapy (NIMART) in-service training and mentorship is critical to ensure that more nurses are prepared to provide comprehensive HIV care and treatment services in a task-shifting setting in accordance with national policies.
- **Competency:** Follow-up evaluation of NIMART training and mentorship is necessary to assess outcomes and identify areas of improvement to ensure that nurses achieve competency in HIV care and treatment. Use of innovative resources such as e-learning for continuing professional development should be explored to ensure that trained and mentored NIMART nurses maintain competency and remain up to date with the latest care and treatment guidelines.
- **Practice:** Further investment in advancing regulation and quality assurance to support NIMART is needed to ensure a full scope of practice for nurses in HIV care and treatment services.

### Acknowledgments

This work has been supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the Health Resources and Services Administration (HRSA, grant no. U92HA12772) under the terms of the Global Nurse Capacity Building Program, cooperative agreement #U92HA127. The contents are the responsibility of ICAP and do not necessarily reflect the views of the United States Government.

### References

- Cameron, D., Gerber, A., Mbatha, M., Mutyabule, J., & Swart, H. (2012). Nurse-initiation and maintenance of patients on antiretroviral therapy: Are nurses in primary care clinics initiating ART after attending NIMART training? *South African Medical Journal*, *102*(2), 98-100.
- East, Central, and Southern Africa. (2014). *Colleges of Nursing*. CPD Library. Retrieved from <http://ecsacon.org/cpd-library/>
- Fairall, L., Bachmann, M. O., Lombard, C., Timmerman, V., Uebel, K., Zwarenstein, M., & Bateman, E. (2012). Task shifting of antiretroviral treatment from doctors to primary-care nurses in South Africa (STRETCH): A pragmatic, parallel, cluster-randomized trial. *Lancet*, *380*(9845), 889-898.
- Georgeu, D., Colvin, C. J., Lewin, S., Fairall, L., Bachmann, M. O., Uebel, K., & Bateman, E. D. (2012). Implementing nurse-initiated and managed antiretroviral treatment (NIMART) in South Africa: A qualitative process evaluation of the STRETCH trial. *Implementation Science*, *7*, 66.
- ICAP, Columbia University. (2010). *Campus to clinic mentoring guide for facilitators*. Retrieved from <http://icap.columbia.edu/resources/detail/campus-to-clinic-manual>
- ICAP, Columbia University. (2014). *Option B+ E-learning module for nurses and midwives*. Retrieved from <http://elearning.icap.columbia.edu>
- McCarthy, C. F., Voss, J., Verani, A. R., Vidot, P., Salmon, M. E., & Riley, P. L. (2013). Nursing and midwifery regulation and HIV scale-up: Establishing a baseline in east, central and southern Africa. *Journal of the International AIDS Society*, *16*, 18051.
- National AIDS and STI Control Programme. (2011). *Guidelines for antiretroviral drug therapy in Kenya*. Retrieved from [http://www.emtct-iatt.org/wp-content/uploads/2013/04/Kenya\\_National-ARV-Guidelines\\_2011.pdf](http://www.emtct-iatt.org/wp-content/uploads/2013/04/Kenya_National-ARV-Guidelines_2011.pdf)
- Nyasulu, J. C. Y., Muchiri, E., Mazwi, S., & Ratshefola, M. (2012). NIMART rollout to primary healthcare facilities increases access to antiretrovirals in Johannesburg: An interrupted time series analysis. *South African Medical Journal*, *103*(4), 232-236.
- Sanne, I., Orrell, C., Fox, M. P., Conradie, F., Ive, P., Zeinecker, J., & Wood, R. (2010). Nurse versus doctor



management of HIV-infected patients receiving antiretroviral therapy (CIPRA-SA): A randomized non-inferiority trial. *Lancet*, 376(9734), 33-40.

United Nations Joint Programme on HIV/AIDS. (2014a). *90-90-90 – An ambitious treatment target to help end the AIDS epidemic*. Retrieved from <http://www.unaids.org/en/resources/documents/2014/90-90-90>

United Nations Joint Programme on HIV/AIDS. (2014b). *Kenya AIDS response progress report: Progress towards zero*. Retrieved from [http://www.unaids.org/sites/default/files/country/documents/KEN\\_narrative\\_report\\_2014.pdf](http://www.unaids.org/sites/default/files/country/documents/KEN_narrative_report_2014.pdf)

World Health Organization. (2013). *Global health observatory data repository*. Retrieved from <http://apps.who.int/gho/data/node.country.country-KEN?lang=en>

World Health Organization. (2008). *Task shifting: Global recommendations and guidelines*. Retrieved from <http://www.who.int/healthsystems/TTR-TaskShifting.pdf?ua=1>

Zuber, A., McCarthy, C. F., Verani, A. R., Msidi, E., & Johnson, C. (2014). A survey of nurse initiated and managed antiretroviral therapy (NIMART) in practice, education, policy and regulation in east, central, and southern Africa. *Journal of the Association of Nurses in AIDS Care*, 25(6), 520-531.