

The Public Health Impact of Training Physicians to Become Obstetricians and Gynecologists in Ghana

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Training physicians to become obstetricians and gynecologists (OB/GYNs) is a well-established component of national capacity in most well-resourced settings. The development of this capacity in sub-Saharan Africa is a critical step toward improving women's health and reducing maternal and neonatal morbidity and mortality. As task shifting to nonphysicians increases for obstetric surgeries,¹ highly skilled professionals will be needed to provide supervision and assist with the unexpected clinical scenarios that will inevitably arise. Obstetrics and gynecology (OB/GYN) training for physicians requires that a comprehensive OB/GYN department be in place with well-trained faculty teachers and researchers so that physicians who successfully complete the program have a comprehensive and site-specific application of known evidence-based practice.

West Africa is unique in that the West African College of Surgeons (WACS) provides a mechanism for physicians who have completed a prescribed course of work, obtained relevant experience, obtained the requisite recommendations, and passed both written and oral exams to be certified as a fellow of the WACS. The WACS is a 5-year training program with regional certification. In 2003, the Ghana College of Physicians and Surgeons (GCPS) was established as a national alternative. The GCPS training program defines the curriculum and requirements to become an OB/GYN in Ghana, offering a 3-year program to become a member or a 1.5-year program for a diploma. Successful completion results in national (Ghanian) certification. Both the WACS and GCPS provide continuing medical education and utilize ongoing quality assurance mechanisms for recertification.

In Ghana, university-based postgraduate OB/GYN training programs were established in 1989 with a grant from the Carnegie Foundation to reverse the trend of Ghanian OB/GYNs trained abroad remaining in the country in which they trained.² Before the postgraduate program was established, only 3

Objectives. We assessed the public health effect of creating and sustaining obstetrics and gynecology postgraduate training in Ghana, established in 1989 to reverse low repatriation of physicians trained abroad.

Methods. All 85 certified graduates of 2 Ghanaian university-based postgraduate training programs from program initiation in 1989 through June 2010 were identified and eligible for this study. Of these, 7 were unable to be contacted, inaccessible, declined participation, or deceased.

Results. Of the graduates, 83 provide clinical services in Ghana and work in 33 sites in 8 of 10 regions; 15% were the first obstetrician and gynecologist at their facility, 25% hold clinical leadership positions, 50% practice in teaching hospitals, and 14% serve as academic faculty.

Conclusions. Creating capacity for university-based postgraduate training in obstetrics and gynecology is effective and sustainable for a comprehensive global approach to reduce maternal and neonatal morbidity and mortality. Policies to support training and research capacity in obstetrics and gynecology are an integral part of a long-term national plan for maternal health. (*Am J Public Health.* 2014;104:S159–S165. doi:10.2105/AJPH.2013.301581)

of the 30 Ghanaian physicians who had qualified as OB/GYNs had returned to Ghana. Prior studies have demonstrated a 98% retention rate for certified physicians who qualified as OB/GYNs in Ghana.^{3,4}

Ghana is situated along the coast of the Gulf of Guinea in Western Africa with a population of approximately 25 million. It ranks 34th in mortality for those aged younger than 5 and has a gross national income per capita of GH¢ 1410. The maternal mortality ratio estimate in 2010 was 350, with a lifetime risk of maternal death of 1 in 68.⁵ The Ghana Health Service implements the health care service delivery activities of the Ghana Ministry of Health.

We investigated the outcomes of a program to create university-based OB/GYN departments that then trained physicians who earned certification by the WACS or the GCPS. We examined the numbers trained, their roles, their geographic distribution, and the effects they have had on their facilities and communities.

METHODS

All graduates of 2 Ghanaian university-based OB/GYN postgraduate training certified

by either the WACS or the GCPS from the initiation of the program in 1989 through June 2010 were eligible for this study. The participants included graduates of both the Korle-Bu Teaching Hospital, which is associated with the University of Ghana Medical School, and the Komfo Anokye Teaching Hospital, which is associated with the Kwame Nkrumah University of Science and Technology Medical School. We collected contact information for each graduate from departmental records. A total of 85 graduates had completed the program. Of these graduates, 1 was deceased, 1 had permanently moved to another country, 1 was out of the country during the study period, 1 was not accessible logistically, 1 could not be contacted with the available contact information, and 2 declined participation because of competing priorities, which left 78 who participated in the interview sessions.

Interview data were collected by E. L. B. between June 8, 2010, and August 26, 2010. Other publicly available data were collected through the end of 2010. Each potential participant was contacted by cell phone, informed of the study, and invited to participate. Once a participant consented to do so, a time

and a place for a face-to-face interview was arranged. Interviews were conducted in homes, department offices, hospital clinics, restaurants, and other offsite locations. They lasted between 9 and 64 minutes and were held in a private space. No incentives were offered.

We developed a 65-item questionnaire to guide the semistructured interviews and piloted it in April 2010. Basic demographic information, training and graduation–certification experience and dates, practice location, time distribution, clinical work, leadership and teaching roles, and research experience were collected. We also obtained information about participants' relationship with the universities attended, community service, work with community-based organizations, and work with national and international committees. Graduates were asked whether they were the first OB/GYN at the site, what changes had been made since their arrival, and for their ideas about how maternal mortality could be reduced. We determined participants' geographic location of practice either by device (Garmin E-Trex Legend GPS, Garmin International, Olathe, KS) or by means of worksite coordinates (<http://boulter.com/gps>).

All the interviews were conducted in English, and 74 were recorded, transcribed, and entered into a Microsoft Access 2007 database (Microsoft Corp., Redmond, WA). Three participants chose to provide only written responses, and 1 interview was not recorded because of technological issues. All data were deidentified for analysis. Quantitative data were exported to SPSS (IBM, Version 9, Armonk, NY) for analysis. For qualitative data, interviews were transcribed verbatim, and F. W. J. A. and E. L. B. reviewed them. They examined two areas of interest—changes since the OB/GYN had started working at the site and suggestions for solving maternal mortality in Ghana—and identified themes and quotes that further explained aspects of the theme to provide context.

RESULTS

Eighty-five graduates had completed an OB/GYN training program in Ghana and received certification by either the WACS or the GCPS. Of these, 80 (94%) were male and 5 (6%) were female. Of the 78 (92%) who were

interviewed, 73 (94%) were married, and their ages ranged from 34 to 60 years (mean = 44; median = 44). Ninety six percent of the participants from Ghana, representing 39 different hometowns. A total of 49 (63%) considered themselves to be from an urban area, 26 (33%) were from a rural area, and the origins of 3 were unknown. One participant was from Liberia.

Participants graduated from a number of medical schools both in Ghana (61; 78%) and abroad: Ukraine (2), Russia (8), China (1), Belarus (2), Kazakhstan (1), and Liberia (1). No medical school data were available for 2 participants. All who studied outside of Ghana received a medical doctor degree, and those who studied in Ghana received a master's degree in biology with a concentration in human biology. Students had graduated from medical school between 1977 and 2004 and had an average of 6 years (median = 6; range = 1–25) from graduation to program entry.

Participants completed their post-graduate training in an average of 5.9 years (median = 6 years). Participants who achieved WACS certification did so in an average of 7.0 years (range = 5–11 years; median = 7 years) and those who achieved GCPS certification did so in an average of 3.7 years (range = 1–6 years; median = 4 years). Variation resulted from the time spent in the different certificate programs and the timing for preparation and scheduling of qualifying exams. Of the participants, 51 were WACS certified, 49 were GCPS certified (3 diploma, 46 membership), and 22 had both certifications (most were foundation members and 1 achieved dual certification at a later time). The cumulative number of retained physicians is depicted in Figure 1.

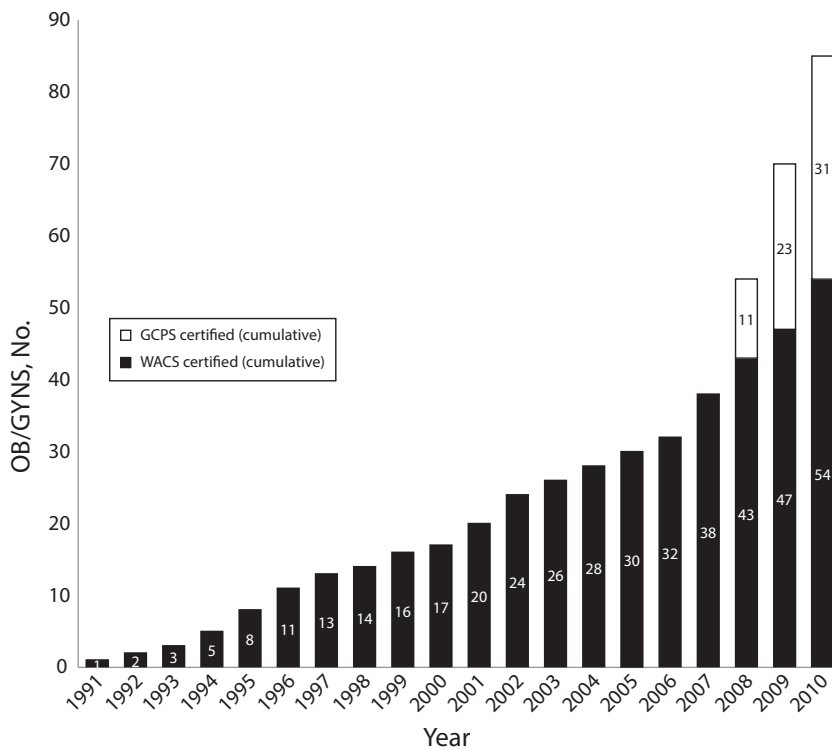
The 78 interviewed participants worked at 33 sites (Figure 2). Most graduates reported clinical work as their major activity, seeing 51 to 200 patients per week and participating in a wide range of clinical activities (Table 1). The Ministry of Health and Ghana Health Service employed 48 (62%) of the participants, the Ministry of Education employed 12 (15%), and 11 (14%) were primarily employed by other government organizations, including the Ministries of Defense and Interior, medical schools, and government hospitals. Seven (9%) reported being primarily involved in a private practice or employed by a private company.

The 12 (15%) graduates employed by the Ministry of Education were academic university-based tenure-track faculty. Of these 12, 3 were serving as head of department, 1 was the vice provost of 1 of the 2 major colleges of health sciences, and 1 was the dean of a medical school. Seven were faculty at Kwame Nkrumah University of Science and Technology in Kumasi, 1 was faculty at the University for Developmental Studies in Tamale, and 4 were faculty at the University of Ghana in Accra. Thirteen other participants reported actively serving as head of department at their facility. Many held either a leadership (44; 56%) or an administrative (39; 50%) position at their facility. Other roles included family planning and reproductive health director, medical superintendent and hospital director, directors of ultrasound and radiology, lead clinician, deputy head of department, team supervisor, and director of health for a large private company. Thirty-two (41%) reported having an ongoing relationship with the university at which they trained, and 17 (22%) held a leadership or administrative position there. Participants who lived in remote areas reported a working relationship with their university. One participant said, "For the medical school, I'm still in touch with almost all the professors. I send them a text message or an e-mail every day—they are very much aware of what I'm doing." Other responsibilities included teaching at the Nurses Training College and other nursing and midwifery schools and administering exams for medical midwifery schools.

Participants explicitly noted a wide range of changes that had been made since their arrival at their facility (see the box on page S164). Fourteen participants (18%) were the first OB/GYNs at the site. Note that these figures represent those who spontaneously gave responses and represent the minimum number of changes because participants were not asked to list all of the changes.

One OB/GYN noted increased range of service delivery and training and opening of new facilities:

I started this place, it was a polyclinic . . . now it's a fully fledged hospital. . . . I started a theatre. Nobody had done surgery here before. I was the only surgeon, doing general surgery as well as OB/GYN surgeries. I started to run the clinic. Apart from the work I do, I provide supervisory



Note. GCPS = Ghana College of Physicians and Surgeons; WACS = West African College of Surgeons.

FIGURE 1—Cumulative number of retained obstetrics and gynecology specialists (OB/GYNS) in Ghana, grouped by first qualification.

visits to other health institutions in OB/GYN. . . . I did a lot of teaching residents/interns. I visit one or two private clinics. Because we are not so many, we share our expertise all around. I'm tasked to open other hospitals and clinics in Accra.

Another graduate noted improvements in clinical care and quality assurance:

Lots of things have changed . . . the way that they managed some of the cases was not right, so I've given them some protocols . . . like the use of magnesium sulfate in the use of management in a case of eclampsia. . . . I have set up a committee that really audits maternal death and perinatal mortality. . . . Since I've been there, I think that's been reduced, just monitoring and auditing the cases that died.

Another graduate noticed changes in referral patterns:

So the cases other people would have gone to [Komfo Anokye Teaching Hospital], they are going here. In the whole district, they refer cases to us. . . . I won't say it's because I'm here but that's part of it. . . . So things have changed because the referrals that are supposed to go are not going and other referrals are coming to this place.

Obstetric referrals in and out were a notable change; 34 participants (44%) reported that they do not refer women to another hospital or clinic. They have only referred because of hospital patient congestion or unavailable cancer care at their location, not because they saw cases beyond their skill level. One participant noted that

Since we came to join, the pressure has gone down, and there has been efficiency and some effective ways in the work. In fact, for now, there are some clear things that we have noticed a change in the trend for the better. I'm expecting that at the end of the year, we will see a drastic reduction in the MM [maternal mortality] figures for the hospital.

A total of 47 participants (60%) reported being members of various national and international committees and work groups. Approximately half (38, or 49%) reported consulting for outside organizations. Among participants, teaching is common; 63 (81%) reported teaching medical students, 52 (67%) reported teaching OB/GYN residents, and 66

(85%) taught midwives. Some participants performed bedside teaching, and others provided formal seminars and lectures for their students. As several respondents put it:

I teach medical students every week; clinic, theatres, emergency rooms, ward rounds . . . so at least, unofficial because I'm not actually in the medical school, but I do bedside teaching and rounds.

and

I give lectures 2x/week. Bedside teaching is almost daily, for medical students and residents. And ward rounds teaching, in the theatre, and teaching at the clinic.

and

I have given 15 lectures in obstetrics and gynecology. And then tutorial and bedside teaching, I don't remember the number of times, so it's like every other day—so 3x/week.

and

We teach during the ward rounds. We have tutorials and seminars for the postgraduates once a week, we have a clinical presentation for the postgraduates once a week. . . . And then every Thursday after our major ward rounds, the whole group goes in for a seminar. . . . Sometimes there is a journal club once a month and there is a mortality meeting every quarter. . . . Korle-Bu sends them here for their rotation.

Of the participants, 57 (73%) were involved in community training or teaching activities, either in person or through radio or television. Forty-five participants (58%) reported performing community service; 47 (60%) reported being actively involved in research, with 20 of them working with medical students and residents. Sixty-five (83%) participants expressed plans for future research, citing money and time constraints as their main hindrances to performing or expanding their existing research. A total of 38 (49%) reported presenting at local or international conferences. Graduates reported publishing a total of 167 articles; 37 (47%) reported having authored or coauthored peer-reviewed articles. Eighteen reported authoring books or book chapters, and 1 graduate of the program was a coeditor for 2 textbooks (*Comprehensive Obstetrics in the Tropics* and *Comprehensive Gynecology in the Tropics*); many had contributed chapters. Twenty-six participants (33%) reported authoring other journal articles, essays, and newspaper and magazine articles.

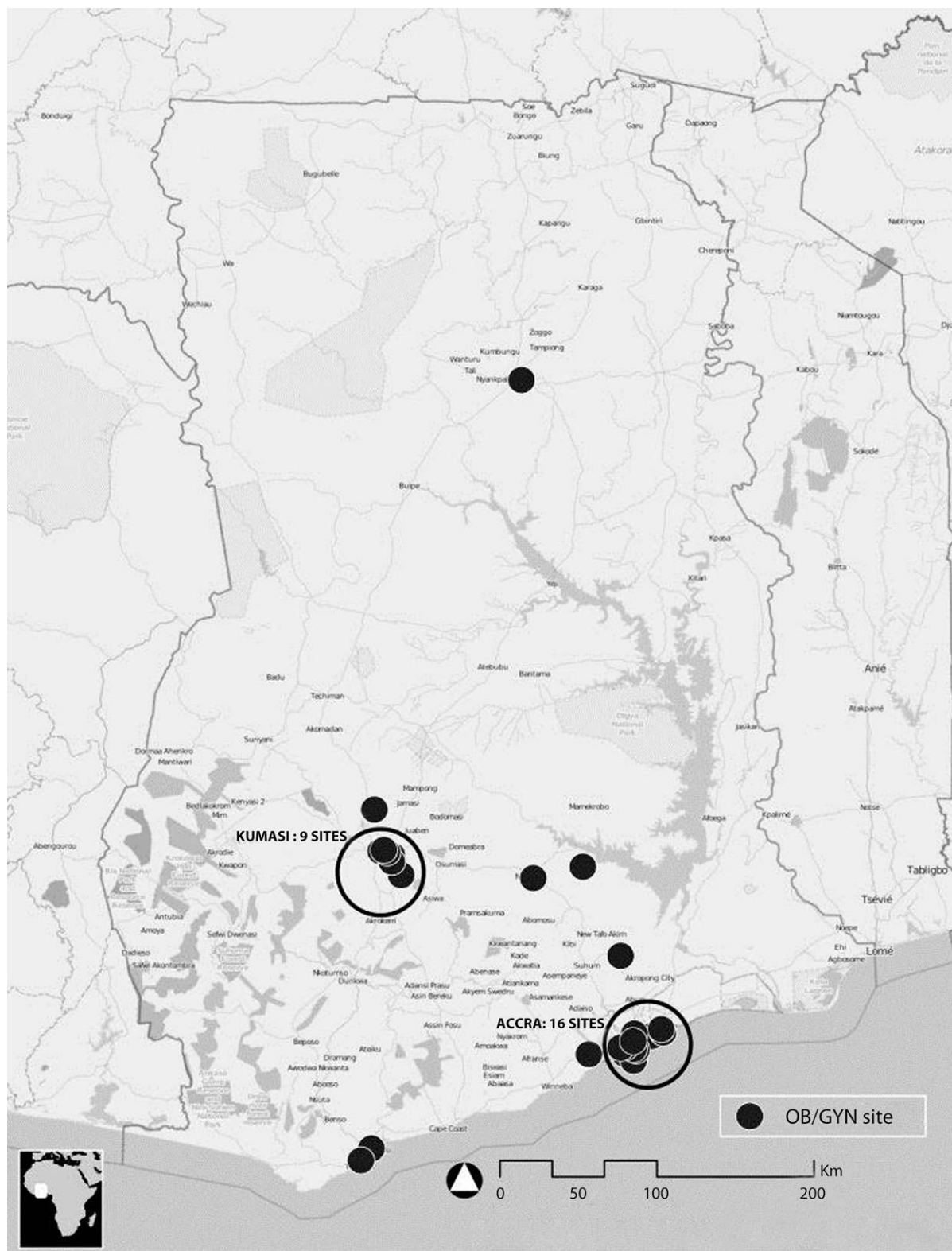


FIGURE 2—Geographic location of the 33 primary work places of graduates of in-country university-based obstetrics and gynecology (OB/GYN) training programs: Ghana, August 2010.

TABLE 1—Number of Certified Physicians (n = 78) Providing Obstetrics and Gynecology (OB/GYN) Services Who Were Trained In-Country: Ghana, August 2010

Procedure	Ever, No. (%)	Past 30 Days, No. (%)	Available When OB/GYNs Started At Facility, No. (%)
Cesarean section	78 (100)	75 (96.2)	
Hysterectomy	78 (100)	73 (93.6)	
Dilation and curettage	77 (98.7)	72 (92.3)	
Tubal ligation	77 (98.7)	64 (82.1)	
Intrauterine device placement			
Mirena	19 (24.4)	10 (12.8)	
Copper	54 (69.2)	30 (38.5)	
Fistula surgery	40 (51.3)	15 (19.2)	
Laparoscopy			
Diagnostic	52 (66.7)	24 (30.8)	
Ovary removal	1 (1.3)	0 (0)	
Ectopic pregnancy	1 (1.3)	0 (0)	
Myomectomy	77 (98.7)	73 (93.6)	
Manual vacuum aspiration	76 (97.4)	69 (88.5)	
Ultrasound	76 (97.4)	74 (94.9)	56 (71.8)
Electronic fetal monitoring	60 (76.9)	47 (60.3)	29 (37.2)
Electrocautery	54 (69.2)	40 (51.3)	41 (52.6)
Misoprostol	76 (97.4)	74 (94.9)	48 (61.5)
ρ(D) Immunoglobulin	73 (93.6)	63 (80.8)	64 (82.1)
Magnesium sulfate	75 (96.2)	70 (89.7)	63 (80.8)

DISCUSSION

The creation of university-based OB/GYN departments in Ghana to train physicians to become certified specialists has transformed maternal care capacity in Ghana. There is now greatly increased national capacity to provide and increase access to emergency obstetrical care and improved access to other comprehensive women's health services and ability to conduct health research to achieve local development goals. The initial inputs from the Carnegie Foundation and US and British universities and professional organizations helped create the faculty and departmental capacity for the training programs to develop.

The policy of creating obstetric capacity in Ghana has resulted in 98% retention of 85 specialists who as of 2010 practiced at more than 33 sites, including peri-urban and district hospitals providing care that would otherwise not have been available at a facility other than the teaching hospital. The Ghana Ministries of Health and Education have integrated all activities for maintaining the faculty and training

into national norms, ensuring sustainability.² As of June 2013, these programs have now produced 142 graduates who are all (but 1) working in Ghana. Currently, 67 (57 male and 10 female) are in the training programs. Some graduates have moved to remote rural areas to provide service and occupy faculty positions at new, more rural medical schools. Many are working in district hospitals, close enough to cities to satisfy familial needs yet far enough away to improve rural access and decrease referrals to the main teaching hospital. These OB/GYNs have provided training and introduced new technologies and protocols that have increased district-level facility capacity to handle obstetric emergencies. Some district sites have become accredited for house officers to perform their required 6 months of obstetrics training and to teach medical students.

The presence of 2 certification bodies in the region provides graduates the opportunity to pursue leadership in local, national, and regional clinical and academic realms. The creation of the GCPS through a legislative act has clearly led to an increase in the number of

Ghanaian physicians who can be certified in their home country and be deployed to rural regions to provide emergency obstetric care and comprehensive women's health care. The GCPS also created a subspecialty fellowship program in family planning that creates physician researchers who provide national leadership in clinical programs and research in reproductive health.⁶

Other examples of postgraduate training programs in low-resource settings have led to improvements in health. In Laos, a 3-year training program trained a cadre of internists who remained in the country and reduced the need for foreign support.⁷ Maternal mortality was improved in Eritrea with centralization of services that included a postgraduate training program that sought to increase the total number of OB/GYNs in the country from 15.⁸ Ghana has recently graduated its first class of emergency medicine specialists and has transformed emergency medical services in Ghana.⁹ In Zambia, 118 specialists were trained over a 22-year period in a Master of Medicine program, 24 (20%) of whom were trained in OB/GYN. Most of the graduates were working in urban settings.¹⁰ The country of Fiji produced 15 OB/GYN specialists in its postgraduate training program, among other specialties that have had a positive impact on health services.¹¹

University-based OB/GYN programs provide a sustainable framework in which the flow of information can lead to the training of OB/GYN academic faculty and practicing clinicians. Increasing the capacity of academic faculty in all of sub-Saharan Africa to prepare certifiable trainees and to conduct research of local and global relevance would create great potential to discover adaptive technologies and protocols that will reduce maternal and neonatal mortality in the African context and contribute new knowledge in OB/GYN. Interest in research is great, yet many faculty are overwhelmed with clinical responsibilities.

Criticism may be levied at training specialists in sub-Saharan Africa that training takes too long and is expensive. This view stems from a perspective of the importance of short-term fixes without consideration of the very long-term and extensive influence of OB/GYNs and their potential to train and provide clinical and policy leadership. Although OB/GYNs are considered specialists, the work they perform

Changes Reported By Sample of Obstetrics and Gynecology Physicians (n = 78) Since Beginning Work at Current Site of Employment: Ghana, August 2010

Category and Specific Examples

Better outcomes

Maternal mortality reduction

Perinatal mortality reduction

More organized, standardized management, or both

Establishment of a maternal mortality audit committee

More organized and efficient management of cases

Formal protocols and better records

Human capacity development

More personnel (nurses, doctors, residents, house officers)

Hospital staffed with more knowledgeable professionals

Better attitudes toward clients

Better doctor-nurse cooperation

Technology

Technology in general has improved

Colposcopy service provided

Cytoscan

Cardiotocography

Fetal monitors or Doppler

New anesthesia machine or new anesthetist

New ultrasound

Laparoscopy

Computerized axial tomography scan, MRI

Other improvements, including delivery beds, suction, heaters for newborns, rehab centers, polymerase chain reaction machine

Teaching improvements

Better medical and postgraduate training and more organized lectures

Better public health-type community training, including antenatal care and infertility clinics

Self-reported better surgical skills

Better midwife training

Negative changes

No change or gotten worse

Too many patients, increased congestion in the hospital

Higher workload, more patients

Decreased number of nurses at hospital

Improved access to care

Reduced referrals out

Increased referrals into hospital

Increased quality of service

Draw patients from a larger radius

Patients have a higher confidence in health care system

More informed patients; increased awareness, patients reporting to hospital earlier than before, more patients delivering at the hospital than at home

has great public health implications. Unlike other skills-specific training, professional certified OB/GYNs can both provide a comprehensive approach in outpatient women's health issues including antenatal care, high-risk pregnancy management, contraception, and cervical cancer screening and diagnose and treat the many morbidities that women experience. Additionally, they can provide end-of-the-line definitive care in cases of prolonged obstructed labor and uterine rupture; severe preeclampsia; hemolysis, elevated liver enzymes, and low platelets syndrome; eclampsia; illicit and incomplete abortion; uterine fibroids; uterine prolapse; infertility; and women's cancers, to name a few. These providers can also provide supervision of, back up for, and remedy for complications that occur as a result of surgeries ever increasingly performed by nonphysicians.¹ Although the WACS and GCPS training programs are 3 to 5 years long, their trainees are providing valuable clinical care services during their training and spending a portion of their training in rural district facilities. Five women (6%) were graduates of this program, and 10 (15%) of the current trainees are female. This gender gap requires further monitoring as more women are admitted to Ghanaian medical schools.

Measuring the impact of specialist training on maternal mortality ratios is not possible because of the numerous other programs and national initiatives that have simultaneously been implemented. The maternal mortality ratio in Ghana has dropped 40%, from 580 in 1990 to 350 in 2010, and is reflected across Africa.¹² Specialist effects on health outcomes are better measured at the facility level, exploring quality of care, case fatality rates, and near-miss and maternal mortality reviews. Program graduates working at a rural teaching hospital in Ghana noted a 74% reduction in maternal mortality (from 1870 to 493) between January 1, 2010, and December 31, 2010.¹³

Specialist training does not replace midwifery training. In Ghana, deliveries by trained providers are conducted by midwives. The rise in coverage provided by increasing the number of midwives in Ghana will necessitate an increase in the number of providers to whom they refer complications. Additionally, the training and deployment of nurse anesthetists, in addition to midwives and obstetricians,

would be needed to provide a comprehensive service to women with severe obstetric complications.

Although great progress has been made globally in the reduction of maternal mortality, United Nations millennium development goal number 5 related to maternal mortality will not be met in most countries in sub-Saharan Africa by the target date of 2015. The post-2015 development agenda must take into consideration the eventual need for OB/GYN capacity in country to address both the clinical and the policy aspects related to maternal and women's health care. This Ghanaian example demonstrates that many years are needed to create the academic base to train a large number of physician trainees who will then practice in increasingly rural areas. The commitment to achieving this capacity must be made now so that in 20 years, a cadre of OB/GYNs will be in place to address the national, regional, and local needs for OB/GYN expertise in clinical, educational, research, and policy arenas.

As evidenced by the mortality-reducing effect of highly trained OB/GYNs and their teams in high-income countries, creating the university-based capacity to train physicians to become OB/GYN specialists in low- and middle-income countries will be a necessary component of a comprehensive national maternal–neonatal morbidity and mortality prevention program and women's health program. Collaborations between academic medical centers and high- and low-income countries can play a major role in increasing national capacity to train and provide service.¹⁴ Where such training programs do not exist, long-term prospects for high-quality comprehensive obstetric capacity will not be available. The Consultative Expert Working Group on research and development to meet health needs in developing countries has called on the global health community to shift priorities to local solutions and incentives to address development problems.¹⁵ National and university policies to train physicians to become OB/GYNs and legislative support of their national and regional certification is a key public health intervention to sustainably reduce maternal and neonatal morbidity and mortality and should be embraced by donors and policymakers as an integral part of long-term women's health care. ■

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Contributors

F. W. J. Anderson contributed to the development of the concept, project design, development of the data collection instruments, analysis and article writing, and editing. S. A. Obed contributed to the project design, data analysis, and article preparation, writing, and editing. E. L. Boothman contributed to data collection, analysis, and article writing, preparation, and editing. H. Opare-Ado contributed to project design, data analysis, and article preparation, writing, and editing.

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Human Participant Protection

This study was exempted by the University of Michigan institutional review board and approved by the Komfo-Anoke Teaching Hospital ethical review committee.

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