



Perspectives on global health amongst obstetrician gynecologists: A national survey

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Abstract

Objective: To characterize contemporary attitudes toward global health amongst board-certified obstetricians-gynecologists (Ob-Gyns) in the US.

Methods: A questionnaire was mailed to members of the American College of Obstetricians and Gynecologists. Respondents were stratified by interest and experience in global health and group differences were reported.

Results: A total of 202 of 400 (50.5%) surveys were completed; and 67.3% ($n = 136$) of respondents expressed an interest in global health while 25.2% ($n = 51$) had experience providing healthcare abroad. Personal safety was the primary concern of respondents (88 of 185, 47.6%), with 44.5% (57 of 128) identifying 2 weeks as an optimal period of time to spend abroad. The majority (113 of 186, 60.8%) cited hosting of local physicians in the US as the most valuable service to developing a nation's healthcare provision.

Conclusion: Despite high interest in global health, willingness to spend significant time abroad was limited. Concerns surrounding personal safety dovetailed with the belief that training local physicians in the US provides the most valuable service to international efforts. These attitudes and concerns suggest novel solutions will be required to increase involvement of Ob-Gyns in global women's health.

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Introduction

Reduction of maternal morbidity and mortality remains an important public health issue worldwide with the most profound disparities for women in low and middle income countries (LMICs).^{1–3} Goal 3 of the recently-published Sustainable Development Goals prioritizes healthcare, with a reduction of the global maternal mortality ratio as a key target.⁴ Additional targets within that goal and others can be impacted through improved access to healthcare for women.⁵ As specialists in healthcare for women, obstetricians and gynecologists (Ob-Gyns) are uniquely placed to play a role in the provision of healthcare for women on an international level.

Hemorrhage and sepsis remain the leading causes of maternal mortality internationally, followed by complications from pregnancy-induced hypertension, obstructed labor, and abortion complications.^{6,7} Ob-Gyns possess the medical knowledge for the management of obstetric complications that contribute to maternal mortality and have the requisite skillset to surgically address these issues when required.⁸ The requirement for surgical interventions to avert morbidity and mortality in LMICs has gained recent recognition with public health agendas focused on increasing access to trained surgical specialists.⁹ Data surrounding available providers are scarce, but estimates suggest that there are approximately 0.13 to 1.57 trained obstetricians per 100 000 members of the population, with target numbers of 20 per 100 000.¹⁰ Alongside this call for action in women's health and provision of surgical

services, is a rising interest in international health amongst US medical students and residents.¹¹

The efforts to increase access to skilled surgeons and emergency obstetric care internationally, coupled with the growing interest in global women's health among current trainees, highlights the opportunity for the involvement of board-certified Ob-Gyns in the current global public health arena.^{12,13} Despite the potential roles available to Ob-Gyns in global health, little is known about the current role played by Ob-Gyns in international healthcare. This study was undertaken to better characterize the knowledge, attitudes, and practices of board-certified US Ob-Gyns toward global health.

Materials & methods

Study participants

The study selected a sample of 400 fellows of the American College of Obstetricians and Gynecologists who were members of the College's Collaborative Ambulatory Research Network (CARN). CARN was developed to increase response rates for College Research Department studies while maintaining a participant pool representative of practicing College members.¹⁴ The typical CARN sample size of 400 participants is based on extensive experience with previous surveys and a motivation to balance a meaningful sample size with over-querying CARN members. Institutional Review Board approval was obtained from the American College of Obstetricians and Gynecologists, Washington, DC, USA and CARN members give written consent for participation in surveys.

Questionnaire

A 39-item questionnaire was developed through the American College of Obstetricians and Gynecologists by one of the authors (J.S.) who has extensive experience in survey administration and development. The questionnaire included demographic questions, questions regarding interest in global health, past participation in global health activities, as well as knowledge-based questions about women's health issues around the world. Participants received initial notification of the survey via an email containing a direct link to the electronic survey between January 2013 and April 2013. Participants who had not completed the electronic survey after five emailings received up to three paper mailings containing a cover letter, questionnaire, and a prepaid envelope for survey return.

Statistical analyses

All statistical analyses were performed using the SAS[®] statistical package, version 9.0 (SAS Institute, Cary, NC, USA). Descriptive statistics were used to report the demographic characteristics and responses of the cohort. Group differences in responses were assessed with *t*-test or χ^2 -test as appropriate. A *P*-value of <0.05 was considered statistically significant.

Results

A total of 202 of 400 questionnaires were returned, giving a response rate of 50.5%. There were respondents from 41 of the US States. Table 1 presents the demographic characteristics of the respondents. There were no statistically significant demographic differences between those with either an interest or experience in global health and those without (data not shown).

Respondents were asked about their attitudes toward global health. When asked to

Table 1. Demographic characteristics of the study participants (*n* = 202) who returned a questionnaire that aimed to determine attitudes toward global health amongst board-certified obstetrician-gynecologists in the US.

Characteristic	Physicians <i>n</i> = 202
Age, years	55.3 ± 9.6
Duration in practice, years	23.5 ± 9.3
Sex, female	105 (52.0%)
Interested in global health	136 (67.3%)
Experience in global health	51 (25.2%)
Race	
White/European American	160 (79.2%)
Black/African American	11 (5.4%)
Asian/Pacific Islander	14 (6.9%)
Hispanic	4 (2.0%)
Other/more than one	6 (3.0%)
No response provided	7 (3.5%)
Clinical practice setting	
Solo/private practice	40 (19.8%)
Partnership/group practice	92 (45.5%)
Multi-specialty group	32 (15.8%)
University full time	20 (9.9%)
Other	17 (8.4%)
No response provided	1 (0.5%)
Practice location	
Urban, inner city	27 (13.4%)
Urban, non-inner city	55 (27.2%)
Suburban	73 (36.1%)
Town of 5000–50 000	36 (17.8%)
Rural/other	11 (5.4%)
Specialty	
General OB/GYN	159 (78.7%)
Gynecology only	25 (12.4%)
Other	18 (8.9%)
Specialist/generalist	
Specialist	66 (32.7%)
Generalist	69 (34.2%)
Both	65 (32.2%)
No response provided	2 (1.0%)
Annual deliveries	
< 1000	38 (18.8%)
1001–2500	58 (28.7%)
2501–5000	70 (34.7%)
> 5000	23 (11.4%)
No response provided	13 (6.4%)

Data presented as mean ± SD or *n* of patients (%).

define the term, 55.1% (108 of 196) stated global health related to any healthcare provided abroad, while 29.1% (57 of 196) broadened the definition to include any underserved area, including those in the US. The majority of Ob-Gyns reported an interest in global health (136 of 202, 67.3%) and amongst those with interest, 76.5% (104 of 136) expressed an interest in providing medical care overseas. Altruism (73 of 136, 53.7%) motivated the majority of these providers, with 'life experience' being the second most common motivator (55 of 136, 40.4%). Other less frequent answers motivating the decision to volunteer included travel (one of 136, 0.7%), research (one of 136, 0.7%), and other unspecified reasons (six of 136, 4.4%). Regarding a practical period of time to spend abroad, amongst the 128 responders who expressed an interest, 57 identified 2 weeks as optimal (44.5%), followed by 1 week (39 of 128, 30.5%). A total of 15.6% (20 of 128) of respondents selected 1 month as the ideal time followed by a minority selecting longer time periods of 3 months (5.5%, seven of 128), 6 months (2.3%, three of 128), and 1 year (1.6%, two of 128) as ideal.

Table 2 presents some of the attitudes of the survey respondents toward global health stratified by interest and experience in global health. Even in the absence of a desire to volunteer, most respondents would either donate money or cover clinical duties without pay so that a colleague could travel abroad. Interest or experience in global health was more likely to generate supportive actions. When asked to rank what factors about a country would impact the decision to work abroad, 47.6% (88 of 185) ranked personal safety as the primary concern. Those with interest or experience in global health were slightly less likely to prioritize this concern though this number did not reach statistical significance (48 of 110 [43.6%] versus 16 of 45 [35.6%], respectively). Degree of urgency was the second

most common concern, followed by availability of healthcare, language, and level of poverty.

Responding Ob-Gyns reported government and local administrative obstacles and lack of infrastructure as the primary impediments to improving medical care in underserved countries. Cost, geographic isolation, and cultural resistance were identified as additional barriers to successful provision of women's healthcare in a developing setting. Those with experience in global health were more likely to prioritize infrastructure as a barrier compared to those without experience (25 of 47 [53.2%] versus 42 of 147 [28.6%], respectively; $P=0.002$) and less likely to prioritize cost (four of 47 [8.5%] versus 33 of 147 [22.4%], respectively; $P=0.03$). Notably, 60.8% (113 of 186) of respondents identified hosting or training local medical personnel in the US as the most valuable service to the development of a nation's healthcare provision. Despite interest in global health, only 51 physicians (25.2%) of respondents had volunteered overseas. Additional responses identified medical volunteerism, financial donation, and donation of medical equipment as most important to successful implementation of global healthcare programs.

Respondents answered 13 knowledge-based questions about obstetrics and gynecology in an international setting. Most respondents reported moderate knowledge of global health (49.0%, 99 of 202), with 37.1% (75 of 202) reporting poor knowledge of the subject. Participants answered a median of 29.0% of knowledge-based questions correctly. When asked to rank the five leading causes of maternal mortality worldwide, 69.5% (130 of 187) correctly identified hemorrhage as the leading cause. Similarly, 66.9% (121 of 181) of respondents correctly recognized hemorrhage as the primary cause of maternal death in Africa. Only 34.8% (65 of 187) of Ob-Gyns correctly identified sepsis as the second-leading cause of

Table 2. Respondent attitudes on global health according to their interest or experience in global health.

	Overall <i>n</i> = 202	Physicians with interest <i>n</i> = 136	Statistical analysis ^a	Physicians with experience <i>n</i> = 51	Statistical analysis ^b
Willing to donate money	<i>n</i> = 196 122 (62.2%)	<i>n</i> = 135 93 (68.9%)	<i>P</i> = 0.003	<i>n</i> = 49 36 (73.5%)	NS
Willing to cover for colleague	<i>n</i> = 196 135 (68.9%)	<i>n</i> = 133 96 (72.2%)	<i>P</i> = 0.04	<i>n</i> = 48 41 (85.4%)	<i>P</i> = 0.005
Factor most influencing decision to volunteer	<i>n</i> = 185	<i>n</i> = 110		<i>n</i> = 45	
Level of poverty	7 (3.8%)	4 (3.6%)	NS	2 (4.4%)	NS
Availability of healthcare	35 (18.9%)	23 (20.9%)	NS	11 (24.4%)	NS
Degree of urgency	46 (24.9%)	30 (27.3%)	NS	12 (26.7%)	NS
Language	9 (4.9%)	5 (4.5%)	NS	4 (8.9%)	NS
Personal safety	88 (47.6%)	48 (43.6%)	NS	16 (35.6%)	NS
Largest impediment to providing global health	<i>n</i> = 194	<i>n</i> = 130		<i>n</i> = 47	
Geographic isolation	12 (6.2%)	8 (6.2%)	NS	4 (8.5%)	NS
Lack of infrastructure	67 (34.5%)	45 (34.6%)	NS	25 (53.2%)	<i>P</i> = 0.002
Government and local administrative obstacles	71 (36.6%)	47 (36.2%)	NS	13 (27.7%)	NS
Cultural resistance	7 (3.6%)	5 (3.8%)	NS	1 (2.1%)	NS
Cost	37 (19.1%)	25 (19.2%)	NS	4 (8.5%)	<i>P</i> = 0.03
Most valuable service	<i>n</i> = 186	<i>n</i> = 128		<i>n</i> = 45	
Medical volunteering	44 (23.7%)	29 (22.7%)	NS	14 (31.1%)	NS
Financial donation	18 (9.7%)	12 (9.4%)	NS	1 (2.2%)	NS
Donation of medical equipment	11 (5.9%)	7 (5.5%)	NS	0 (0.0%)	NS
Hosting local personnel in the US	113 (60.8%)	80 (62.5%)	NS	30 (66.7%)	NS

Data presented as mean \pm SD or *n* of patients (%).

^aPhysicians with interest compared with those without interest (their data not shown on table) using χ^2 -test or Fisher's Exact test as appropriate.

^bPhysicians with experience compared with those without experience (their data not shown on table) using χ^2 -test or Fisher's Exact test as appropriate.

NS, no significant between-group difference; *P* \geq 0.05.

worldwide maternal mortality. The majority of Ob-Gyns (53.4%, 93 of 174) identified unsafe abortion as the fifth cause of maternal mortality when it is, in fact, the third-leading cause.

When queried about specific rates of maternal and neonatal mortality, the majority of respondents underestimated these rates. For instance, 27.0% (47 of 174) correctly identified the maternal mortality ratio in Somalia as 1000 per 100 000 live

births. However, 66.7% (116 of 174) of respondents underestimated this ratio with responses ranging from 10 to 500 per 100 000 live births. Similarly, 28.2% (49 of 174) recognized the correct neonatal mortality rate in Somalia of 50 per 1000 births though the remainder (71.8%, 125 of 174) of respondents underestimated the rate. When asked how many women are living with unrepaired obstetric fistulae worldwide, only 13.0% (23 of 177) correctly reported

3 000 000. Most Ob-Gyns (79.1%, 140 of 177) underestimated the burden of this condition with estimates ranging between 500 000 and 2 000 000.

Discussion

This survey of US-based board-certified Ob-Gyns investigated the knowledge of providers related to women's global health and queried the attitudes and practices regarding provision of care in LMICs. Overall interest in global health and providing care overseas was high, but experience was limited. Practical considerations such as personal safety, socioeconomic barriers, and time away from work were identified as the biggest impediments to serving abroad. General knowledge of topics related to international women's health was limited and tended to underestimate the geographic burden of disease. Though knowledge patterns did not vary based on experience or interest, attitudes toward limitations to practicing global health was significantly affected by provider experience. These data characterizing the relationship of practicing Ob-Gyns to the field of global health reveal important considerations for those interested in global women's health.

Most respondents expressed interest in global health in general and in providing healthcare overseas, specifically. Amongst those with interest, only 9.4% of respondents identified a time period greater than 1 month as optimal. This preferred approach is concerning from both an obstetric and gynecologic perspective. Short-term surgical trips where physicians address high volumes of cases with high burden of disease-specific morbidity with immediate follow-up care in the hands of in-country physicians have many challenges. Such trips tend to suffer from higher mortality and complication rates at an increased cost and with the potential for detrimental effects on local infrastructure.¹⁵ Caring for obstetric

patients in countries with nearly 10-fold lower Cesarean delivery rates compared with the US rate of 30% requires education and cultural sensitization surrounding local delivery practices.^{16,17} Such competency is unlikely to occur in the 1–2 week period identified as ideal by 75% (96 of 128) of respondents.

The majority of Ob-Gyns cited altruism as the driving factor for their interest in global health though many expressed practical concerns about working abroad. With this in mind, it is not surprising that 61% (113 of 186) of respondents identified hosting or training local medical personnel as the most valuable service to develop a nation's healthcare infrastructure. Though Ob-Gyns recognize this as a viable solution to overcome many of the practical barriers to providing care for women overseas, and models for bidirectional exchange exist, this too is not without its challenges.^{18,19}

The concept of the physician 'brain drain' has been well described in both the medical and surgical arenas of global health.²⁰ A significant proportion of surgeons who migrate from LMICs on a temporary basis end up staying in the US at an estimated cost to their country of origin of \$32 926 to \$127 221 per physician lost.^{21,22} Alternative strategies to training local physicians without removing them from the population that they serve have been successful. For example, the Ghana postgraduate obstetrics/gynecology collaborative residency training program reversed the retention rate of local Ob-Gyns from 10% to 100% as last reported 14 years after its implementation.²³ Few of the Ob-Gyn programs that provide opportunities for US residents to visit LMICs offer a reciprocal spot to local trainees, and the extent to which these programs offer local training from visiting faculty is not known.^{18,24} Outside of the infrastructure of existing partnerships, exportable teaching modules have attempted to improve access to care through

local education of providers on more basic knowledge and procedural skills.²⁵ Increasing access to surgical specialists, anesthesiologists, and obstetricians through augmented training efforts and task shifting offers exciting potential for increasing access to care in these settings.⁹ Such strategies represent opportunities for service and training of local personnel that interested respondents, without succumbing to the pitfalls of draining local resources.

In addition to the aforementioned needs of international learners, interest in global women's health is growing domestically as well. Despite the demand amongst US trainees, many respondents indicated that practical concerns such as length of time away and personal and professional obligations limited their current ability to practice globally. These same respondents, however, indicated that they would consider pursuing these opportunities later in their career. This desire to delay global health involvement until later in one's career is in contrast to the growing demand for mentorship and training amongst US medical students and residents early in their training.²⁶ Currently, only 17% of US obstetrics and gynecology residency programs offer residents activities in global health – a low number compared with the percentage of General Surgery or Internal Medicine residencies offering international opportunities to trainees.^{24,27–29} The interest in global health amongst US trainees will likely continue to grow as demonstrated by the expanding medical student participation in international opportunities.^{30–32} Recent statements from the Association of Professors of Gynecology and Obstetrics indicate that there is a focus on developing international opportunities in Ob-Gyn for medical students and cite the need for oversight and mentorship as essential components of these programs.²⁴ This growing need for mentorship for US undergraduate and graduate trainees coupled with the desire of the majority of Ob-Gyns to

pursue international experiences later in their careers represents an exciting opportunity. Practicing Ob-Gyns could work in tandem with programs for trainees to share their expertise on a global scale.

Despite limitations in pursuing these opportunities, interest in international women's health amongst practicing Ob-Gyns is high. Knowledge of patterns and burden of disease, however, is surprisingly limited. Though Ob-Gyns were aware of general causes of maternal mortality such as hemorrhage, respondents routinely underestimated the prevalence of morbidity and mortality related to conditions unique to LMICs such as unsafe abortion, obstructed labor, and obstetric fistulas. Complications such as obstetric fistulas that require not only efforts at primary prevention but coordinated and long-term surgical follow-up underscore the complexities of global women's health.³³ Limited knowledge of these complications seems to suggest a lack of understanding of the intricacies surrounding up-scaling care for women in these settings. These findings represent an opportunity to focus continuing medical education efforts on issues of women's global health to better improve understanding amongst Ob-Gyns with an interest in the field.

Interpretation of these current data is restricted by a few important limitations. CARN methodology prioritizes maintaining a population of participants that mirrors the national composition of the field. The 50% of providers responding to the questionnaire provides a similar response rate to other surveys published in the field both through CARN and other studies in global health. However, this subset of providers does not necessarily reflect the majority opinion of the specialty. Like any survey, this present study was subject to selection bias in that those with no interest in global health were less likely to complete the survey. This present study reveals important information

for future Ob-Gyn focused global health programs from the perspective of US-based providers. However, the present study did not enquire as to specific preferences or strategies to address increasing the role of Ob-Gyns in global health. The absence of corresponding attitudes from practicing Ob-Gyns in these LMICs leaves ideas regarding programmatic implementation somewhat incomplete. Any ethical program would undoubtedly take these opinions into consideration before embarking on a new international opportunity.³⁴ Furthermore, though useful for data analysis, the rigid multiple-choice and ranking nature of the questionnaire precludes respondents the opportunity to supply innovative ideas in the approach to women's global health that a more qualitative approach could provide. Follow-up inquiries exploring practical strategies to mitigate safety concerns, increase knowledge, and remove barriers for long-term trips is an important area of future research. Further surveys exploring knowledge, attitudes, and practices of Ob-Gyn residents and partner institutions could glean additional information. Incorporating the perspectives of these stakeholders into programmatic development and educational initiatives could improve involvement of US-based Ob-Gyns in the provision of care for women in LMICs.

In summary, this survey is the first to investigate practicing US-based Ob-Gyns' knowledge, attitudes, and practices regarding women's global health. Though the high levels of need and interest may be limited by practical barriers, such as concerns for personal safety, chances for involvement exist. The recognition of the importance of training local providers coupled with the short duration of time respondents would be willing to spend abroad highlights the need for partnerships in training through innovative techniques. The development of long-term, sustainable, and regulated partnerships may avoid the pitfalls of draining of

local physician resources while preventing the detrimental effects of short-term surgical trips by inadequately trained providers. This survey highlights the need for more targeted research in this arena for the implementation of successful programs integrating US Ob-Gyns into the realm of global women's health.

Declaration of conflicting interests

The authors declare that there are no conflicts of interest.

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References

1. Filippi V, Chou D, Ronsmans C, et al. Levels and causes of maternal mortality and morbidity. In: Black RE, Laxminarayan R, Temmerman M, Walker N (eds) *Reproductive, maternal, newborn, and child health: disease control priorities, third edition (Volume 2)*. Washington (DC): The International Bank for Reconstruction and Development/The World Bank, 2016 Apr. Chapter 3.
2. Main EK and Menard MK. Maternal mortality: time for national action. *Obstet Gynecol* 2013; 122: 735–736.
3. Thaddeus S and Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med* 1994; 38: 1091–1110.
4. United Nations. UN sustainable development goals. <http://www.un.org/sustainabledevelopment/sustainable-development-goals/> (accessed 31 May 2016).
5. Langer A, Meleis A, Knaul FM, et al. Women and health: the key for sustainable development. *Lancet* 2015; 386: 1165–1210.
6. Say L, Chou D, Gemmill A, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health* 2014; 2: e323–e333.

7. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 to 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380: 2095–2128.
8. UN Population Fund. Monitoring emergency obstetric care—a handbook. France: World Health Organization; UN Population Fund; United Nations Children’s Fund; averting maternal death and disability program, 2009. <http://www.unfpa.org/publications/monitoring-emergency-obstetric-care> (accessed 30 May 2016).
9. Meara JG, Leather AJ, Hagander L, et al. Global surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Lancet* 2015; 386: 569–624.
10. Hoyler M, Finlayson SR, McClain CD, et al. Shortage of doctors, shortage of data: a review of the global surgery, obstetrics, and anesthesia workforce literature. *World J Surg* 2014; 38: 269–280.
11. Hampton BS, Chuang AW, Abbott JF, et al. To the point: obstetrics and gynecology global health experiences for medical students. *Am J Obstet Gynecol* 2014; 211: 18–23.
12. Pearson L and Shoo R. Availability and use of emergency obstetric services: Kenya, Rwanda, Southern Sudan, and Uganda. *Int J Gynaecol Obstet* 2005; 88: 208–215.
13. Molina G, Esquivel MM, Uribe-Leitz T, et al. Avoidable maternal and neonatal deaths associated with improving access to caesarean delivery in countries with low caesarean delivery rates: an ecological modelling analysis. *Lancet* 2015; 385(Suppl 2): S33.
14. Leddy MA, Lawrence H and Schulkin J. Obstetrician-gynecologists and women’s mental health: findings of the Collaborative Ambulatory Research Network 2005–2009. *Obstet Gynecol Surv* 2011; 66: 316–323.
15. Shrimel MG, Sleemi A and Ravilla TD. Charitable platforms in global surgery: a systematic review of their effectiveness, cost-effectiveness, sustainability and role training. *World J Surg* 2015; 39: 10–20.
16. Ologunde R, Vogel JP, Cherian MN, et al. Assessment of cesarean delivery availability in 26 low- and middle-income countries: a cross-sectional study. *Am J Obstet Gynecol* 2014; 211: 504.e1–504.e12.
17. Molina G, Weiser TG, Lipsitz SR, et al. Relationship between cesarean delivery rate and maternal and neonatal mortality. *JAMA* 2015; 314: 2263–2270.
18. Tierney WM, Nyandiko WN, Siika AM, et al. “These are good problems to have...”: establishing a collaborative research partnership in East Africa. *J Gen Intern Med* 2013; 28(Suppl 3): S625–S638.
19. Anderson FW. *Building academic partnerships to reduce maternal morbidity and mortality*. Michigan: Michigan Publishing, University of Michigan Library, 2013. <https://deepblue.lib.umich.edu/handle/2027.42/120503> (accessed 31 May 2016).
20. World Health Organization. WHO global code of practice on the international recruitment of health personnel, 2010. http://www.who.int/entity/hrh/migration/code/code_en.pdf?ua=1 (2010, accessed 12 December 2014).
21. Hagander LE, Hughes CD, Nash K, et al. Surgeon migration between developing countries and the United States: train, retain, and gain from brain drain. *World J Surg* 2013; 37: 14–23.
22. Mills EJ, Kanfers S, Hagopian A, et al. The financial cost of doctors emigrating from sub-Saharan Africa: human capital analysis. *BMJ* 2011; 343: d7031.
23. Klufio CA, Kwawukume EY, Danso KA, et al. Ghana postgraduate obstetrics/gynecology collaborative residency training program: success story and model for Africa. *Am J Obstet Gynecol* 2003; 189: 692–696.
24. Hung KJ, Tsai AC, Johnson TR, et al. Scope of global health training in U.S. Obstetrics and gynecology residency programs. *Obstet Gynecol* 2013; 122: 1101–1109.
25. Elit LM, Rosen B, Jimenez W, et al. Teaching cervical cancer surgery in low- or middle-resource countries. *Int J Gynecol Cancer* 2010; 20: 1604–1608.
26. Drain PK, Holmes KK, Skeff KM, et al. Global health training and international clinical rotations during residency: current status, needs, and opportunities. *Acad Med* 2009; 84: 320–325.

27. Jayaraman SP, Ayzengart AL, Goetz LH, et al. Global health in general surgery residency: a national survey. *J Am Coll Surg* 2009; 208: 426–433.
28. Kolars JC, Halvorsen AJ and McDonald FS. Internal medicine residency directors perspectives on global health experiences. *Am J Med* 2011; 124: 881–885.
29. Powell AC, Casey K, Liewehr DJ, et al. Results of a national survey of surgical resident interest in international experience, electives and volunteerism. *J Am Coll Surg* 2009; 208: 304–312.
30. Drain PK, Primack A, Hunt DD, et al. Global health in medical education: a call for more training and opportunities. *Acad Med* 2007; 82: 226–230.
31. Abedini NC, Gruppen LD, Kolars JC, et al. Understanding the effects of short-term international service-learning trips on medical students. *Acad Med* 2012; 87: 820–828.
32. Houpt ER, Pearson RD and Hall TL. Three domains of competency in global health education: recommendations for all medical students. *Acad Med* 2007; 82: 222–225.
33. Wall LL. Obstetric vesicovaginal fistula as an international public-health problem. *Lancet* 2006; 368: 1201–1209.
34. Committee opinion no. 466: ethical considerations for performing gynecologic surgery in low-resource settings abroad. *Obstet Gynecol* 2010; 116: 793–799.