Medical diaspora: an underused entity in low- and middle-income countries’ health system development

Seble Frehywot  
*Milken Institute School of Public Health, The George Washington University*

Chulwoo Park  
*Milken Institute School of Public Health, The George Washington University*, charles.park@sjsu.edu

Alexandra Infanzon  
*Lenoir-Rhyne University*

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Medical diaspora: an underused entity in low- and middle-income countries’ health system development

Seble Frehywot 1*, Chulwoo Park 1 and Alexandra Infanzon 2

Abstract

Background: At present, over 215 million people live outside their countries of birth, many of which are referred to as diaspora—those that live in host countries but maintain strong sentimental and material links with their countries of origin, their homelands. The critical shortage of Human Resources for Health (HRH) in many developing countries remains a barrier to attaining their health system goals. Usage of medical diaspora can be one way to meet this need. A growing number of policy-makers have come to acknowledge that medical diaspora can play a vital role in the development of their homeland’s health workforce capacity. To date, no inventory of low- and middle-income countries (LMIC) medical diaspora organizations has been done. This paper intends to develop an inventory that is as complete as possible, of the names of the LMIC medical diaspora organizations in the United States of America, the United Kingdom, Canada, and Australia and addresses their interests and roles in building the health system of their country of origin.

Methods: The researchers utilized six steps for their research methodology: (1) development of rationale for choosing the four destination countries (the United States of America, the United Kingdom, Canada, and Australia); (2) identification of low- and middle-income countries (LMIC); (3) web search for the name of LMIC medical diaspora organization in the United States of America, the United Kingdom, Canada, and Australia through the search engines of PubMed, Scopus, Google, Google Scholar, and LexisNexis; (4) development of inclusion and exclusion criteria and creation of a medical diaspora organizations’ inventory list (Table 1) and corresponding maps (Figures 1, 2, and 3). Using decision criteria, reviewers narrowed the number to a final 89 organizations; (5) synthesis of information to collect the general as well as the unique roles the medical diaspora organizations play in building health systems; and (6) developing inventory of respective LMIC governments’ diaspora offices (Table 2) to identify units/departments that facilitate diaspora’s work.

Result: In total, the authors found 89 medical diaspora organizations in 4 main countries: in the United States of America 60, in the United Kingdom 24, in Australia 3, and in Canada 2. These medical diaspora organizations tend to have three focuses: providing healthcare services, training, and when needed humanitarian aid to their home country; creating a social or professional network of migrant physicians (i.e., simply to bring together people with an ethnic and professional commonality) and; supplying improved and culturally sensitive healthcare to the migrant population within the host country. Sixty-eight LMIC countries have established a diaspora office within their government office. It is also equally important to note that many policy-makers may lack knowledge of models for medical diaspora engagement or of valuable lessons learned by other governments about working with diaspora.

Conclusions: The medical diaspora remains an underutilized resource in both health systems policy formulation and program implementation.

Keywords: Medical diaspora, Low- and middle-income countries, Capacity development

* Correspondence: seblelf@gwu.edu

1 Milken Institute School of Public Health, The George Washington University, 950 New Hampshire Ave. NW, Washington, DC, USA

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Background
There are various definitions of the term diaspora, many of which have evolved over time. Once exclusively used in a context-bound way, describing that of Jewish history and the plight of Jewish people being dispersed “among the nations,” the folk term became generalized on a grand (global) scale in the late twentieth century. Since the 1970s, “diaspora” has been increasingly used to denote people living far away from their ancestral or former homeland, which is reflected in Sheffer’s definition of the modern diaspora as “ethnic minority groups of migrant origins residing and acting in host countries but maintaining strong sentimental and material links with their countries of origin, their homelands” [1]. For many developing countries, remittances from the diaspora are an important source of foreign exchange, surpassing earnings from major exports, and covering a substantial portion of imports [2]. The history of the semantics of the term “diaspora” points to several changes of the term’s meaning. As is fairly well known, “diaspora” is a Greek term. The noun δῆμος is a derivation from the Greek composite verb “dia-” and “spairein” (διά + εἶπεῖν, infinitive), adopting meanings of “to scatter,” “to spread,” or “to disperse” [3]. For the purpose of this paper, medical diaspora is defined by the authors as physicians that have migrated from their country of origin to another country.

The Sustainable Development Goals (SDGs), which build upon the Millennium Development Goals (MDGs), emphasize a cross-thematic framework in the post-2015 development agenda [4]. Although health is not explicitly mentioned, the SDGs demonstrate the important linkages between health and development. To achieve these ambitious targets, the international community around the globe has committed to investing heavily in health systems to support these efforts, particularly in training and retention of health workers. However, the critical shortage of Human Resources for Health (HRH) in many developing countries remains a barrier to optimizing these efforts [5, 6]. Usage of medical diaspora can be one way to meet this need. Diaspora groups possess vital knowledge of the social and cultural context of their homelands. Over the past few years, the contributions of migrants and diaspora to sustainable development in their countries of origin and destination have been acknowledged by the 2030 Agenda for Sustainable Development, the New York Declaration for Refugees and Migrants and the Summits of the Global Forum on Migration and Development [7]. In addition, countries may want to advance the utilization of the medical diaspora as a way of countering the negative impacts created by the medical migration. Return migrants, in particular, bring back their skills and work experience from abroad boosting productivity [8].

To date, no inventory of low- and middle-income countries’ (LMIC) medical diaspora organizations, based on their location, specialty of work, and the prospect and feasibility of using them for the capacity development of the health workforce in LMIC has been done. The authors set out with the research question of “do medical diaspora organizations exist in these four developed countries and if they do, what are the key roles of these organizations?”

Based on this, this paper aims to develop an inventory that is as complete as possible, of the roles of the LMIC medical diaspora organizations in building the health care system of their country of origin.

Methods
The method for the paper is comprised of six steps:

1. Development of rationale for choosing the four destination countries (the United States of America, the United Kingdom, Canada, and Australia)

From the outset, for two main reasons, the focus of this research has been on four anglophone destination countries: the United States of America, the United Kingdom, Canada, and Australia. This is because of two reasons. First, in many cases medical diaspora are actively recruited by the wealthy nations of Europe, North America, Australia, and elsewhere [9], and second specifically, because international medical graduates constitute between 23 and 28 percent of physicians in the United States of America, the United Kingdom, Canada, and Australia, and lower-income countries supply between 40 and 75% of these international medical graduates [10].

2. Identification of low- and middle-income countries

This list was obtained from the World Bank website [11].

3. Web search

For each LMIC country, search for the name of medical diaspora organization in the United States, the United Kingdom, Canada, and Australia was conducted through PubMed, Scopus, Google, Google Scholar, and LexisNexis. Each individual LMIC country was connected with the search terms of medical diaspora organization, medical diaspora engagement, medical diaspora services, medical diaspora initiatives, and medical diaspora contributions using Boolean Operation “AND” and “OR.” Through this, a list of 130 medical diaspora organizations was identified.

4. Development of inclusion and exclusion criteria and creation of a medical diaspora organizations’ inventory list and corresponding maps
By using inclusion and exclusion criteria, the list of 130 medical diaspora organizations was narrowed down to 89 medical diaspora organizations.

- Inclusion criteria:

Medical diaspora organizations that are located in the following four countries: Australia, Canada, the United Kingdom, and the United States of America.

Medical diaspora organizations’ members are from a specific LMIC country.

The organization mainly consists of medical doctors.

The organization name clearly includes word associated with the medical profession.

The medical diaspora organizations’ headquarter office has an active webpage and indicates the actual address of the headquarter office.

- Exclusion criteria:

Biomedical science, scientist, or engineer diaspora organizations

Nurse or pharmacist diaspora organizations

Organizations of regions or chapters: Many of organizations had branches across the country, such as in the name of regions or chapters, but it was worth including only the representative one, such as headquarter, to maintain the simplicity of the medical diaspora organization list (see Table 1).

- Exception:

There are four medical diaspora organizations that have been included because they did not satisfy all inclusion criteria: Association of Philippine Physicians in America, Philippine Medical Association in America, Sri Lanka Medical Association of North America, and Vietnamese Physicians Association. Although the headquarters of those organizations had no website, there were a number of their chapters with viable websites across the United States of America.

Once the list was finalized, an inventory list of the medical diaspora organizations in the United States of America, the United Kingdom, Canada, and Australia was developed together with a corresponding map (see Table 1 and Figs. 1, 2, and 3).

5. Synthesis of information

Based on the research question, each medical diaspora website and the articles we found about it was searched to collect the work that the particular institution engages in and the general as well as the unique roles the medical diaspora organization plays in building health systems.

6. Developing inventory of respective LMIC governments’ diaspora offices

For each LMIC country, a search of the respective LMIC Ministry of Foreign Affairs sites (or its equivalent) was conducted to identify the existence, contact information and details of government units or departments that facilitate diaspora’s work. A per LMIC country inventory list of this units was created (see Table 2).

Results

In total, we found 89 medical diaspora organizations: 60 in the United States of America (US), 24 in the United Kingdom (UK), 3 in Australia, and 2 in Canada. Most of them are based in the United States of America, followed by the United Kingdom, Australia, and Canada, while the others work on an international level [12] (see Table 1 and Figs. 1, 2, and 3). Moreover, a total of 41 LMIC countries of origin was found among which those that originated from Asia were 21, from Africa 8, from the Americas 8, and from Europe 4 (Table 1):

- Asia (21): Afghanistan, Armenia, Bangladesh, Burma, Cambodia, China, India, Iran, Iraq, Israel, Lebanon, Myanmar, Nepal, Pakistan, Philippines, Russia, Sri Lanka, Syria, Taiwan, Thailand, and Vietnam
- Africa (8): Cameroon, Egypt, Ethiopia, Ghana, Nigeria, Sierra Leone, Sudan, and Tanzania
- America (8): Argentina, Bolivia, Colombia, Dominican Republic, Haiti, Nicaragua, Peru, and Venezuela
- Europe (4): Albania, Romania, Serbia, and Ukraine

Common attributes

Improving medical resources in their home country

The common attribute shared by all medical diaspora organizations is the desire to improve medical resources in their home country, including building medical facilities in their home country. Almost all migrant health workers have professional ties with their countries of origin supporting health, education, and social structures, felt indebted to their countries of origin, felt obliged to help as they were once granted scholarships or training opportunities, and thus, wanted to improve life in their countries of origin [13]. The level of contribution of each medical diaspora organization or individual varies. For instance, while Abdalla et al. (2016) reported that the effectiveness of the Sudanese medical diaspora was “small magnitude, infrequent and not well organized [14],” Nwadiuko et al. (2016) concluded that U.S.-based Nigerian physicians’ strong belief in effectiveness of Nigerian medical agencies would contribute to medical service trips to Nigeria [15]. In another instance,
Table 1 The list of medical diaspora organizations

| Medical diaspora organizations (in alphabetical order) | URL site |
|--------------------------------------------------------|---------|
| 1. Academy of Persian American Physicians               | http://persianphysician.org |
| 2. Afghan Medical Association of America                 | http://www.afghanmed.org |
| 3. Afghan Medical Professionals Association of America   | http://www.ampaa.org |
| 4. Albanian American Medical Society, Inc.               | https://www.albamedsociety.org |
| 5. American Association of Cardiologists of Indian Origin| http://www.aacio.org |
| 6. American Association of Physicians of Indian Origin   | https://aapiusa.org |
| 7. American Board Certified Doctors for Egypt            | http://www.doctorsforegypt.com |
| 8. American Lebanese Medical Association                  | https://www.almamater.org |
| 9. American Nepal Medical Foundation                     | https://www.anmf.org |
| 10. American Society of Indian Plastic Surgeons          | https://www.facebook.com/American-Society-of-Indian-Plastic-Surgeons-18929321104812 |
| 11. American Ukrainian Medical Foundation               | http://aumf.net |
| 12. Argentine-American Medical Society                   | http://www.aams.us |
| 13. Armenian American Medical Society                    | https://aamsc.org |
| 14. Armenian Medical Society of Great Britain            | http://www.accc.org.uk |
| 15. Association of Afghan Healthcare Professionals UK    | http://aashpuk.org |
| 16. Association of Chinese American Physicians           | http://www.acaponline.org |
| 17. Association of Haitian Physicians Abroad             | http://www.amhe.org/index.html |
| 18. Association of Kerala Medical Graduates              | http://www.akmg.org |
| 19. Association of Nepali Physicians in America          | http://anpa-usa.org |
| 20. Association of Nigerian Physicians in the Americas   | https://www.anpa.org |
| 21. Association of Pakistani Physicians and Surgeons of the UK | http://appsuk.org |
| 22. Association of Philippine Physicians in America*     | Although this representative organization has no website, there are a number of its chapters in each state. |
| 23. Association of Physicians of Pakistani Descent of North America | http://appna.org |
| 24. Australia Myanmar Medical Association                 | http://www.au-mma.org |
| 25. Bangladesh Medical Association of North America      | https://www.bmana.org |
| 26. Bangladesh Medical Association UK                    | http://www.bmsuk.org.uk |
| 27. Bolivian American Medical Society                    | http://www.bolivianamericanmedicalsociety.com |
| 28. British Association of Physicians of Indian Origin    | https://www.bapio.co.uk |
| 29. British Iranian Medical Association                  | https://www.facebook.com/8IMAUK |
| 30. British Islamic Medical Association (for Sudanese descent)| http://www.britishima.org |
| 31. Burmese American Medical Association                  | http://www.bamausa.org |
| 32. Burmese Doctors and Dentists Association UK          | https://www.facebook.com/8DDAUK/?ref=page_internal |
| 33. Burmese Medical Association Australia                | https://www.facebook.com/Burmese-Medical-Association-Australia-BMAA-1015014088940538 |
| 34. Burmese Medical Association of North America         | http://bma-na.com |
| 35. Cambodian Health Professionals Association of America| https://www.chpaa.org |
| 36. Cameroon Doctors UK                                   | https://www.camdocuk.org/home |
| 37. Canadian Association of Nigerian Physicians and Dentists | http://canpad.org |
| 38. Chinese American Medical Society                      | http://chineseamericanmedicalsociety.cloverpad.org |
| 39. Chinese American Physicians Society                   | http://www.caps-ca.org |
| 40. Dominican Medical Association                         | http://www.dmanewyork.com |
| 41. Egyptian American Medical Association                 | http://www.e-ama.org |
| 42. Egyptian American Medical Society                     | http://www.egyptianamericanms.com |
| Medical diaspora organizations (in alphabetical order) | URL site |
|-------------------------------------------------------|---------|
| 43. Egyptian Association for American Medical Training and Research | www.eamtar.com |
| 44. Egyptian Medical Society UK | http://www.egyptianmedical.org.uk |
| 45. Ethiopian North American Health Professionals Association | http://enahpa.org |
| 46. Ghana Physicians and Surgeons Foundation | https://www.ghanaphysicians.org |
| 47. Ghanaian Doctors & Dentists Association | https://www.gddauk.org |
| 48. Iranian American Medical Association | https://www.iama.org |
| 49. Iranian Medical Society | http://wwwiranianmedicalsociety.org/index.cfm |
| 50. Iranian Medical Society UK | http://wwwiranianmedicalsociety.org.uk |
| 51. Iranian-American Medical Society of Greater Washington (Iranian Medical & Dental Society of the Greater Wash-Balt Metro Area) | http://www.iamsgw.org |
| 52. Iraqi Medical Association UK | https://www.imauk.com |
| 53. Iraqi Medical Sciences Association USA | https://www.imsausa.org |
| 54. Medical Associations of Nigerians Across Great Britain | http://www.mansag.org |
| 55. Myanmar American Medical Education Society | http://mamesociety.org |
| 56. Nepalese Doctors Association | http://ndaHK.org.uk/index.php/home |
| 57. Nicaraguan American Medical Association | http://www.nicamed.com |
| 58. Nigeria American Medical Foundation International | https://namfi.org |
| 59. North American Taiwanese Medical Association | https://www.natma.org |
| 60. Northern Indian Medical & Dental Association of Canada | http://www.nimdac.com |
| 61. Organization of Sierra Leonean Healthcare Professionals Abroad | http://www.toshpa.org.uk/index.htm |
| 62. Pakistan Medical Association UK | https://www.facebook.com/pages/category/Medical-Company/Pakistan-Medical-Association-UK-346946281999626 |
| 63. People To People (Ethiopia) | https://p2pbridge.wordpress.com |
| 64. Peruvian American Medical Society | http://www.pams.org/ |
| 65. Philippine Medical Association in America* | Although this representative organization has no website, there are a number of its chapters in each state. | http://wwwrajmaai.com |
| 66. Rajasthan Medical Alumni Association | https://www.facebook.com/Romanian-Medical-Association-of-America-250257948368293 |
| 67. Romanian Medical Association of America | https://wwwfacebook.com/romanianmedicalsociety |
| 68. Romanian Medical Society UK | http://www.russianmedicalorganization.org/|
| 69. Russian American Medical Association | http://www.samd.org |
| 70. Serbian American Medical and Dental Society | http://www.serbianama.org |
| 71. Serbian American Medical Association | http://www.spsatoday.com |
| 72. Society of Philippine Surgeons in America | https://sasda.org.au |
| 73. South Australian Sri Lankan Doctors Association | Although this representative organization has no website, there are a number of its chapters in each state. | https://www.srilankan-mdsa.org.uk |
| 74. Sri Lanka Medical Association of North America* | https://www.facebook.com/Romanian-Medical-Association-of-America-250257948368293 |
| 75. Sri Lankan Medical and Dental Association of the UK | https://www.sama-sd.org |
| 76. Sudanese American Medical Association | https://www.sjda.uk |
| 77. Sudanese Junior Doctors Association UK | https://www.africanmedicalsocietyofuk.org |
| 78. Sudanese Medical Association UK and Ireland | https://www.facebook.com/groups/sma-ukandire/?ref=group_header |
| 79. Syrian American Medical Society Foundation | https://www.sams-usanet.org |
| 80. Syrian British Medical Society | http://sb-ms.org |
| 81. Tanzania UK Healthcare Diaspora Association | http://tuheda.org |
| 82. Thai Physicians Association of America | https://tpaa.us |
| 83. Ukrainian Medical Association of North America | https://www.umana.org |
Wojczewski et al. (2015) have shown that African medical doctors who left their home countries as refugees cannot engage in any form of return initiatives, either short or long-term [13].

**African countries**

The Nigerian American Medical Foundation International (NAMFI) aims to provide world-class tertiary medical care on Nigerian soil through a gradual three-phase program of a sustainable 20-year development plan [16]. The Sudanese Medical Association UK and Ireland (SMA) aims to provide advice and support to the colleagues responsible for health services, medical and health education in Sudan, and contribute to the transfer of modern technology, expertise, and scientific updates to Sudan through cooperation with professional bodies and health authorities in the country [17]. The diaspora organizations collaborate with health professionals in their home country to provide a pathway for the exchange of information between the countries.

**Table 1** The list of medical diaspora organizations (Continued)

| Medical diaspora organizations (in alphabetical order) | URL site |
|--------------------------------------------------------|----------|
| 84. Ukrainian Medical Association of the UK           | http://www.umauk.com |
| 85. United States Colombian Medical Association        | https://uscmawordpress.com |
| 86. University of Santo Tomas Medical Alumni Association in America (Philippine) | https://ustmaamerica.wildapricot.org |
| 87. Venezuelan American Medical Association             | https://www.vamainfo.com |
| 88. Vietnamese American Medical Association             | http://www.vamausa.org |
| 89. Vietnamese Physicians Association*                  | Although this representative organization has no website, there are a number of its chapters in each state. |
Ethiopian North American Health Professionals Association achieves this by using distance learning, providing medical training, and sponsoring international medical fellowships for Ethiopian health providers [18]. Similarly, the Ghana Physicians and Surgeons Foundation of North America (GPSF) aims to provide quality training for healthcare professionals in Ghana by providing subscriptions to world-class medical journals, superb online educational tools, and teaching materials to medical colleges in Ghana [19].

**Asian countries**
The American Association of Physicians of Indian Origin (AAPI) has set up multiple AAPI clinics in India, which offer free and compassionate health care [20]. The Afghan Medical Professionals Association of America
Table 2 Table of country diaspora offices within the respective Ministry of Foreign Affairs

| Country                | Engagement office                                                                 | Website                                                      | Year established |
|------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------|
| Afghanistan            |                                                                                 |                                                              | Not available   |
| Albania                | Ministry of Foreign Affairs, Diaspora Department                                |                                                              | Not available   |
| Algeria                | Ministry of National Solidarity, Family and the National Community Abroad      |                                                              | Not available   |
| American Samoa        |                                                                                 |                                                              | Not available   |
| Angola                 | Ministry of Foreign Affairs, Institute of the Angolan Communities Abroad and Consulate Affairs | http://www.mirex.gov.aq                                     | Not available   |
| Armenia                | Ministry of Diaspora                                                             |                                                              | Not available   |
| Azerbaijan             | State Committee on Affairs of the Diaspora                                       | http://www.azerbaijans.com/content_556_en.html                | 2002            |
| Bangladesh             | Ministry of Expatriates’ Welfare and Overseas Employment (MEWOE)                | http://www.probashi.gov.bd                                    | 2001            |
| Belarus                |                                                                                 |                                                              | Not available   |
| Benin                  | Ministry for Foreign Affairs, African Integration, the Francophone Community, and Beninese Abroad | Not available                                               | Not available   |
| Bhutan                 |                                                                                 |                                                              | Not available   |
| Bolivia                |                                                                                 |                                                              | Not available   |
| Bosnia Herzegovina     | Ministry of Human Rights and Refugees: Department of Diaspora                    | http://www.mhr.gov.ba/iseljenistvo/aktuelnosti/Archive.aspx?langTag=bs-BA&template_id=12&pageIndex=1 | Not available   |
| Botswana               |                                                                                 |                                                              | Not available   |
| Brazil                 | Ministry of Foreign Affairs, Undersecretary General for Brazilian Communities Abroad | http://www.brasileirosnomundo.itamaraty.gov.br               | Not available   |
| Bulgaria               | State Agency for Bulgarians Abroad                                              | http://www.aba.government.bg/?show=10                         | 2000            |
| Burkina Faso           | Ministere Des Affaires Etrangres Et De La Cooperation Regionale                  | http://www.mae.gov.bf                                         | 2007            |
| Burundi                | Ministry of Foreign Affairs, Directorate of Diaspora                             | Not available                                               | Not available   |
| Cambodia               |                                                                                 |                                                              | Not available   |
| Cameroon               | Not available                                                                    |                                                              | Not available   |
| Cape Verde             | Not available                                                                    |                                                              | Not available   |
| Central African Republic|                                                                                 |                                                              | Not available   |
| Chad                   | Not available                                                                    |                                                              | Not available   |
| China                  | State Council, Overseas Chinese Affairs Office of the State Council; Overseas Chinese Affairs Committee The Overseas Chinese Affairs Office (SOCAO) of Shanghai Municipal People's Government | http://www.overseas.sh.cn                                    | 1978, renamed 1980 |
| Colombia               | Colombia Nos Une, a program of the Bureau of Consular Affairs and Colombian Communities Abroad in the Ministry of Foreign Affairs | http://www.redescolombia.org                                 | Not available   |
| Comoros                | Ministry of External Relations and Cooperation of the Diaspora                   |                                                              | Not available   |
| Congo, Dem. Rep. of    |                                                                                 |                                                              | Not available   |
| Congo, Rep. of         |                                                                                 |                                                              | Not available   |
| Costa Rica             |                                                                                 |                                                              | Not available   |
| Cote D'Ivoire          |                                                                                 |                                                              | Not available   |
| Cuba                   |                                                                                 |                                                              | Not available   |
| Country   | Engagement office                                      | Website                                                                 | Year established |
|-----------|-------------------------------------------------------|------------------------------------------------------------------------|------------------|
| Djibouti  | Ministry of Trade, Industry, Consumer, Diaspora Affairs | http://www.dominica.gov.dm/employment-trade-industry-and-diaspora-affairs | Not available    |
| Dominica  | National Presidential Council for Dominican Communities Abroad | http://www.dominica.gov.dm/employment-trade-industry-and-diaspora-affairs | Not available    |
| Dominican Republic | National Presidential Council for Dominican Communities Abroad | | Not available |
| Ecuador   | Ministry of Manpower and Emigration, Emigration Sector, Higher Committee on Migration | | Not available |
| El Salvador | Ministry of Foreign Affairs, Vice Ministry for Salvadorans Abroad | http://www.ree.gob.sv | 2004 |
| Eritrea   | Ministry of Foreign Affairs, Department of Eritreans Abroad | http://www.mfa.gov.et/Diaspora/more.php?newsid=7 | Late 1990's |
| Ethiopia  | Ministry of Foreign Affairs, Diaspora Affairs Directorate General, Ministry of Capacity Building, Diaspora Coordinating Office | http://www.mfa.gov.et/Diaspora/more.php?newsid=7 | 2002 |
| Fiji      | Ministry of Foreign Affairs and Guineans Abroad | No website but phone number was found: Phone +224 30 45 12 70 | Not available |
| Gabon     | Ministry of Foreign Affairs, International Cooperation & Gambians Abroad | | Not available |
| The Gambia | Ministry of Foreign Affairs, International Cooperation & Gambians Abroad | | Not available |
| Georgia   | State Ministry for Diaspora Issues | http://diapass.state.gov.ge/index.php?lang_id=ENG | 2008 |
| Ghana     | Ministry of Interior, National Migration Unit | http://www.mfa.gov.gh/index.php?id=1 | 2003 |
| Grenada   | Office of Diaspora Affairs, division of Ministry of Foreign Affairs | http://www.oxonwebmaster.com/mfa/index.php?q=diaspora | 2009 |
| Guatemala | National Council for Migrants from Guatemala | | Not available |
| Guinea    | Ministry of Foreign Affairs and Guineans Abroad | No website but phone number was found: Phone +224 30 45 12 70 | Not available |
| Guinea-Bissau | Ministry of Foreign Affairs Diaspora Unit | http://www.minfor.gov.gy/index.php?option=com_content&task=view&id=70&Itemid=120 | Not available |
| Guyana    | Ministry of Haitians Living Abroad | http://mhave.gouv.ht | 1995 |
| Haiti     | Ministry of Haitians Living Abroad | | 1995 |
| Honduras  | Ministry of Overseas Indian Affairs Government of Kerala, Department of Non-Resident Keralites’ Affairs; Government of Gujarat, Non-Resident Indian Division | | Not available |
| India     | Ministry of Manpower and Transmigration | http://moia.gov.in | 2004 |
| Indonesia | Ministry of Manpower and Transmigration | http://indonesia.go.id/en/ministries/ministers/ ministry-of-manpower-and-transmigration/1644-profile/194-kementeriann-tenaga-kerja-kerja-dan-transmigrasi.html | 1983 |
| Iran      | Ministry of Migration and Displaced | | |
| Country | Engagement office | Website | Year established |
|---------|------------------|---------|------------------|
| Kenya  | Ministry of Foreign Affairs: Diaspora Affairs Directorate i.e. International Jobs and Diaspora Office (Directorate) | http://www.kenyaembassytlv.org.il/209618/MINISTRY-OF-FOREIGN-AFFAIRS-ON-DIASPORA | 2007 |
| Kiribati | Not available | Not available | |
| Korea, Dem. Rep. of | Not available | Not available | |
| Kosovo | “Services for Citizens” Ministry of Foreign Affairs | http://www.mfa-ks.net/?page=2,151 | Not available |
| Kyrgyz Republic | Ministry of Foreign Affairs and Emigrants | Not available | |
| Lao PDR | Association: Diaspora Alliance | http://lesothopretoria.com/?trade_14 | Not available |
| Lesotho | Ministry of states with no portfolio | Not available | |
| Liberia | Ministry of Foreign Affairs—Diaspora Services | http://www.foreignaffairs.gov.mw/index.php/diaspora-services/overview | Not available |
| Libya | Agency for Emigration | Not available | |
| Macedonia, FYR | Ministry of Malians Abroad and African Integration Consultation Framework on Migration High Council of Malians Abroad | http://www.ime.gob.mx | 2002 |
| Mauritania | Ministry Charged with the Moroccan Community Residing Abroad Interdepartmental Committees Hassan II Foundation for Moroccans Resident Abroad Council on the Moroccan Community Abroad | Not available | |
| Micronesia, Federated States of | Bureau of Inter-Ethnic Relations has a Diaspora branch | http://www.bri.gov.md/index.php?pag=sec&id=122&l=en | Not available |
| Montenegro | Ministry Charged with the Moroccan Community Residing Abroad | Not available | |
| Morocco | Institute for Mozambican Communities Living Abroad (INACE) -a department in the Ministry of Foreign Affairs | http://www.iom.int/cms/en/sites/iom/home/news-and-views/press-briefing-notes/pbn-2014b/pbn-listing/mozambique-launches-diaspora-eng.html | 2014 |
| Myanmar | Not available | Not available | |
| Country                | Engagement office                                                                 | Website                                                                 | Year established |
|-----------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------|
| Namibia               | Ministry of African Integration and Nigerians Abroad Committee in Charge of Migration | http://www.messrs.ne/index.php?option=com_content&view=article&id=70ministere-des-affaires-etrangeres-de-integration-africaine-et-des-nigeriens-a-lextérieur&catid=1:liste-des-appelles-du-service-civique-national-pro&Itemid=67 | Not available    |
| Nepal                 | Technical Working Group and Interministerial Committee on Migration               | http://www.nigeriadiosporaday.com/index.php/about/nnvs                  | 2002             |
| Nigeria               | Ministry of Overseas Pakistanis                                                   | http://www.ophrd.gov.pk/gop/index.php?q=aHR0cDovLzE5Mi4xNjguNzAuMTM2L2hyZC9kZWZhdWx0LmFzczHg%3D | Not available    |
| Papua New Guinea      | Not available                                                                     |                                                                        |                  |
| Paraguay              | Ministry of Foreign Affairs, Undersecretary for Peruvians Abroad Advisory Council | http://www.ree.gob.pe                                                   | 2003             |
| Philippines           | Philippines Department of Labor, Overseas Workers Welfare Administration; Department of Labor, Philippine Overseas Employment Administration; Department of Foreign Affairs, Office of the Undersecretary for Migrant Workers’ Affairs; Office of the President, Commission on Filipinos Overseas; Committee on Overseas Workers Affairs | http://www.owwa.gov.ph; https://cfo.gov.ph/                              | 1981             |
| Romania               | Ministry of Foreign Affairs, Department for Relations with the Romanians Abroad   | http://www.dprp.gov.ro/about-us                                         | Not available    |
| Russian Federation    | Department on diaspora engagement within the Ministry of External Relations and Internal Cooperation (MINAFFET), Diaspora General Directorate (DGD), Rwandan Community Abroad (RCA) | http://www.minaffet.gov.rw/index.php?id=890                             | 2008             |
| Samoa                 | Not available                                                                     |                                                                        |                  |
| Sao Tome and Principe | Ministry of Senegalese Abroad                                                     | http://www.diplomatie.gouv.sn                                           | 2003             |
| Senegal               | Ministry of Religion and Diaspora                                                  | http://www.mfa.gov.rs/en/consular-affairs/diaspora/diaspora-general-information |                  |
| Serbia                | Office of the President, Office of the Diaspora                                    | http://www.moci.gov.br/index.php?option=com_content&view=article&id=1&Itemid=2 | 2007             |
| Sierra Leone          | Ministry for Diaspora and Community Affairs, Office for Development and Partnership with the Puntland Diaspora Community | http://www.moci.gov.br/OfficeforDiasporaAffairs                          |                  |
| Somalia               | Department of International Relations and Cooperation                             | http://www.dla.gov.za                                                  | Not available    |
| South Africa          | Diaspora Engagement Steering Committee for South Sudan                             | https://www.facebook.com/southsudandiasporaforhealth                    | 2013             |
| South Sudan           | Ministry of Foreign Employment Promotion and Welfare                              | http://www.foreignemploymin.gov.lk                                     | 2010             |
| St. Lucia             | Not available                                                                     |                                                                        |                  |
| St. Vincent and the   | Ministry for Diaspora and Community Affairs, Office for Development and Partnership with the Puntland Diaspora Community | http://www.moci.gov.br/OfficeforDiasporaAffairs                          |                  |
| Grenadines            | Not available                                                                     |                                                                        |                  |
AMPAA aims at promoting medical education and research, providing educational assistance by means of teaching materials, training opportunities, and collaboration with Afghan medical professionals, and providing assistance in improving the quality of medical education in Afghanistan [21].

**European countries**
The Albanian American Medical Society aims to create and maintain a fostering educational environment between the public academic institutions in the Albanian populated territories and those in the United States of America wherein its members may meet to exchange medical knowledge and participate in continuing medical education [22]. The mission of the Armenian American Medical Society is to cultivate and develop professional, social, and friendly relations among its members, and to contribute towards the improvement of the health services rendered to the Armenian community in the Diaspora and Armenia [23]. The Ukrainian Medical Association of the United Kingdom aims at developing ties with academic and professional healthcare organizations in the United Kingdom and Ukraine to promote social, cultural, educational, and research activities [24]. The Romanian Medical Association of America encourages fostering the establishment of

| Country                  | Engagement office                                                                 | Website                                                                 | Year established |
|--------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------|
| Sudan                    | Ministry of Foreign Affairs and Expatriates                                       | http://www.moex.gov.sy                                                | 2011             |
| Suriname                 | Not available                                                                      |                                                                        |                  |
| Swaziland                | Not available                                                                      |                                                                        |                  |
| Syrian Arab Republic     | Ministry of Foreign Affairs and Expatriates                                       | http://www.moex.gov.sy                                                |                  |
| Tajikistan               | Not available                                                                      |                                                                        |                  |
| Tanzania                 | Minister for Foreign Affairs and International Cooperation: task force of stakeholders, which involves members from his ministry, Ministry of Labour and Employment, Planning Commission, Public Service Management and National Statistics Bureau, which will be in charge of monitoring and coordinating engagement Diaspora | http://www.foreign.go.tz                                             |                  |
| Thailand                 | Not available                                                                      |                                                                        |                  |
| Timor-Leste              | Not available                                                                      |                                                                        |                  |
| Togo                     | No apparent dept, but entire section of website dedicated to Togolese diaspora affairs | http://www.republicoftogo.com/Toutes-les-rubriques/Diaspora            |                  |
| Tonga                    | Not available                                                                      |                                                                        |                  |
| Tunisia                  | Ministry of Social Affairs, Solidarity, and Tunisians Abroad                       |                                                                        |                  |
| Turkey                   | Not available                                                                      |                                                                        |                  |
| Turkmenistan             | Not available                                                                      |                                                                        |                  |
| Tuvalu                   | Not available                                                                      |                                                                        |                  |
| Uganda                   | Diaspora office in the ministry of foreign affairs                                | http://www.mofa.go.ug/data/smenu/16/Overview-and-Mandate.html          | 2007             |
| Ukraine                  | Not available                                                                      |                                                                        |                  |
| Uzbekistan               | Not available                                                                      |                                                                        |                  |
| Vanuatu                  | Not available                                                                      |                                                                        |                  |
| Venezuela, Bolivarian Republic of | The Committee on overseas Vietnamese affairs, under the Ministry of Foreign Affairs | http://www.mofa.gov.vn/en                                               | 2004             |
| Vietnam                  | Not available                                                                      |                                                                        |                  |
| West Bank and Gaza       | Office within Ministry of foreign affairs**                                       | http://www.foreignaffairs.gov.zm/index.php                             |                  |
| Yemen                    | Not available                                                                      |                                                                        |                  |
| Zambia                   | Not available                                                                      |                                                                        |                  |
| Zimbabwe                 | Not available                                                                      |                                                                        |                  |

| Total: 68                |                                                                                   |                                                                        |                  |
professional interactions between North American and Romanian physicians and scientists, medical societies, universities, and institutions [25].

Building medical human resource capacity in their home country
Many LMIC countries have been plagued for years with brain drain. Shortages of medical school faculty are rampant in many sub-Saharan African countries [26]. Medical diaspora organizations try to address this in one form or the other.

African countries
The People to People works to mobilize the global Ethiopian medical diaspora to play an active role in mitigating the impact of brain drain [27]. One of the goals of The Medical Association of Nigerians Across Great Britain is to support the improvement and effectiveness of Nigeria’s health programs by developing and increasing the capacity of health professionals in Nigeria and overseas [28]. The Association of Nigerian Physicians in the Americas encourages the development of practical solutions to Nigerian health care problems through strategic initiatives and field activities within Nigeria [29].

Asian countries
The Nepalese Doctors’ Association in the United Kingdom aims to contribute to the development of health services in Nepal by establishing greater understanding and co-operation among the Nepalese doctors in the United Kingdom [30]. The America Nepal Medical Foundation supports the Nepali people’s ongoing efforts to enhance their health status and focuses on improving the quality of medical care, medical education, and medical research in Nepal [31]. The Afghan Medical Professionals Association of America aims at improving the current health status of the Afghan nation and extending medical and educational aid to Afghanistan [21]. The Bangladesh Medical Association of North America supports local immunization clinics and free clinics in Bangladesh [32]. The Syrian American Medical Society Foundation, in collaboration with local physicians in Syria, has launched training campaigns for doctors in Syria [33].

New trend—web-based medical diaspora organization
While most medical diaspora organizations have their own websites that provide an in-depth and informative introduction about them, some organizations only have Facebook pages and do not maintain their websites anymore. For example, the Sudanese Medical Association UK and Ireland, The Romanian Medical Association of America, and The Burmese Doctors and Dentists Association UK, British Iranian Medical Association are still active through Facebook pages [17, 25, 34, 35]. This new trend is utilized to effectively gather young medical doctors, scholars, and researchers to share the information with each other in the era of internet networking.

Diaspora engagement: government level
Governments around the world have been supporting diaspora institutions and create migration policy [36, 37]. As can be seen in Table 2, diaspora institutions are in the form of ministry, agency, department, council, bureau, or institute. A growing number of policy-makers have come to acknowledge that diasporas can play a vital role in the development of their homelands and some developing countries have established institutions within their countries to further facilitate ties with their diasporas systematically (see Table 2). Sixty-eight LMIC countries have established a diaspora office within their government office.

Many LMICs are developing strategies to harness the resources of diaspora groups to drive development. China and India have created an increasingly extensive diasporic infrastructure, combined with policies designed to attract investments, as well as emotionally bind the diaspora to their country of origin. For instance, the Government of India is providing incentives to its diaspora, such as the recognition of persons of Indian origin through a special ministry and arranging special conferences, and the organization of a research scientist scheme that encourages diaspora scientists to teach at Indian universities [38]. In China, diaspora engagement policy has involved aggressively recruiting the return of its highly skilled diaspora through a variety of employment and scholarship programs [39]. The approaches adopted by these Asian nations point to country-driven initiatives that are built on shared development objectives between the government and the diaspora, and underlined by comprehensive policies, administrative structures, and incentives to foster an enabling environment for mobilizing diaspora resources (expertise, investments, entrepreneurship, and corporate affiliations) around critical growth pillars [40].

Furthermore, more than 30 African countries have established diaspora-oriented institutions and ministries, and many have created permanent diaspora government offices [41] (Table 2).

These offices are often a part of their respective Ministries of Foreign Affairs, either at the ministry or the sub-ministry level. Many countries also utilize consular networks that serve as the primary mechanism to engage with diaspora.

The government of Ethiopia has established some legal status for the Ethiopian diaspora. Ethiopian diasporas who hold non-Ethiopian nationalities have been entitled
to an “Ethiopian Origin ID Card” that grants them some of the rights and privileges of an Ethiopian national [42]. In 2007, the Government of Kenya established the Diaspora Affairs Directorate through the Ministry of Foreign Affairs. This office creates opportunities to mobilize diaspora to participate in the formulation of an overall diaspora engagement policy. As an example, the Government of Sierra Leone established the Directorate of Diaspora Affairs (Directorate) in the Ministry of Presidential and Public Affairs and the government has been explicit about its intention to utilize the diaspora network to fill gaps in the availability of medical doctors and nurses [43]. On the contrary, while many governments acknowledge the importance of diaspora engagement in development, many still lack the capacity to design effective policies and implement them on a meaningful scale [44].

Discussion

Throughout the collection of medical diaspora organizations from LMICs, some trends were noticed. Medical diaspora organizations tend to have three focuses: providing healthcare services, training, and when needed humanitarian aid to their home country; creating a social or professional network of migrant physicians (i.e., simply to bring together people with an ethnic and professional commonality); and supplying improved and culturally sensitive healthcare to the migrant population within the host country. Ethnic groups that did not necessarily have a large or well-established population within the host country came from countries where serious health problems still exist and were the most likely to have the first focus. Most of the diaspora groups from African countries fell into this category. Some groups from South/Southeast Asian countries like Bangladesh, as well as groups from select Middle Eastern and Central/Eastern European countries, also had this focus. Diaspora groups with a strong emphasis on the second focus were mainly intended to help new migrants feel welcome, make friends and successfully find jobs in the new country, as well as provide a forum for discussion of culturally relevant. In addition, these diaspora organizations are mainly used as a networking source to facilitate the exchange of information in the community, as opposed to providing services to their home countries [45]. Associations like these existed across diaspora groups from many continents, and mainly indicated a more casual, less explicitly purposed level of organization/mission. Ethnic groups that had a large and long-standing population within the host country were most likely to have the third focus—that of providing improved care to the migrant population. Such medical diaspora groups are exemplified by the Chinese, Thai, Vietnamese and Hispanic Americans, as well as Pakistanis and Indians in the United Kingdom.

In addition, there were other particular findings. Discovering which countries did not have medical diaspora groups was also sometimes interesting and may be instructive in identifying factors that contribute to an engaged diaspora. For example, though there are large migrant populations of South Africans across the world, no South African medical diaspora has been found. The same was true for Botswana and Namibia, although many other African countries, some with possibly with smaller migrant populations, had diaspora organizations. Crush et al. research on South African physicians in Canada shows that even though the South African medical diaspora in Canada who are mainly white, continue to assert their South African identity, they constitute a disengaged diaspora who are dissatisfied with the post-apartheid South African state [46]. Likewise, Chikanda and Dodson also showed that dissatisfaction with the political environment in the country of origin can have an adverse impact on the medical doctors’ desire to engage positively with the country of origin [47]. Other countries without medical diaspora organizations included most of the Pacific Islands, Indonesia, Lao, Libya, Tunisia, Senegal, and others. Why these communities do not have diaspora organizations while so many others similar or smaller countries do, might be an informative and interesting question to ask. In the same manner, it was interesting to note that only a handful of organizations have produced peer-reviewed articles. Instead, most of the work they perform is distributed among the community as newsletters. According to the research, the most notable work done in the field of publication is by the Syrian American Society, which sponsors a peer-reviewed online medical journal [48] It is also equally important to note that many policy-makers may not have comprehensive knowledge of their own diaspora’s development efforts and interests. Most, also, lack knowledge of models for diaspora engagement or of valuable lessons learned by other governments about working with diaspora. Thus, the health field related diaspora remains an underutilized resource and poorly-accounted-for factor in both health systems policy formulation and program implementation.

Limitation

The following limitations in our research analysis made a potential impact on our research findings. First, there was a lack of available data on diaspora organizations, which limited the scope of our analysis and our ability to recognize additional common characteristics between the diaspora organizations. We have tried to do a very thorough search to find medical diaspora organizations, but there could be organizations that we have not found. Second, there is no previous global-level research study
published on this matter. Without a proper foundation on this topic, we created the first analysis of its kind. To overcome these limitations, new researches are needed on medical and other health-related diaspora associations and their link to building various components of the health systems in LMIC. Third, we focused only on Anglophone recipient countries and did not include Francophone, Lusophone, Arabic speaking or other destination countries. Fourth, we acknowledge that there may be the possible existence of some medical diaspora organizations without an online presence. Finally, the authors believe more in-depth research is warranted to develop metrics to measure the effectiveness of medical diaspora organizations.

Conclusions
Newland and Patrick identified the role of diasporas’ supporting groups who pursue charitable enterprises and that their contribution has expanded beyond just investment inflows and remittances [49]. Diasporas are now viewed as important agents of change by countries of origin, donor agencies, and the international community. The skills of the diasporas can be tapped by establishing knowledge exchange networks. Some initiatives include mentor-sponsor programs, joint research projects, peer reviewer mechanisms, virtual return (through distance teaching and e-learning), and short-term visits and assignments. To increase the benefits of these activities, countries will have to map the gaps that they require to be filled in their health systems, survey the human resources available in their diasporas, create active networks, and develop specific activities and programs.

Despite this progress, work must continue to build the evidence base to develop the knowledge and capacity of engaging diaspora effectively at scale in a systematic and sustainable way. Countries and development partners should emphasize evaluation of efforts and mechanisms to share “what works” on a global platform to contribute to the global dialog. As we move forward, it will be increasingly important to utilize this evidence to build strategic partnerships between states, international organizations, civil society and private sector to create a framework for medical diaspora engagement and facilitate a transfer of resources and knowledge sharing.

Abbreviations
DNA: Diaspora Networks Alliance; HRH: Human Resources for Health; IDEA: International Diaspora Engagement Alliance; LMIC: Low- and middle-income countries; MDGs: Millennium Development Goals; SDG: Sustainable Development Goals; WHO: World Health Organization

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Authors’ contributions
SF had the idea for the study, designed the study, and wrote the paper. CP and AI helped researching and writing the paper. All authors collected and analyzed data, and revised and approved the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication. All authors read and approved the final manuscript.

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Competing interests
The authors declare that they have no competing interests.

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