Ethics and policy of medical brain drain: a review

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Abstract

Health-worker migration, commonly called "medical brain drain", refers to the mass migration of trained and skilled health professionals (doctors, nurses, midwives) from low-income to high-income countries. This is currently leaving a significant number of poor countries, particularly in sub-Saharan Africa, with critical staff shortages in the healthcare sector. A broad consensus exists that, where medical brain drain exacerbates such shortages, it is unethical, and this review presents the main arguments underpinning this view. Notwithstanding the general agreement, which policies are justifiable on ethical grounds to tackle brain drain and how best to go about implementing them remains controversial. The review offers a discussion of the specific ethical issues that have to be taken into account when deciding which policy measures to prioritise and suggests a strategy of policy implementation to address medical brain drain as a matter of urgency.

Key words: medical brain drain; human resources for health; health-worker migration; ethics; policy

Introduction

Health-worker migration, commonly called 'medical brain drain', is part of larger problem known as the global health workforce crisis [1], that is, the grossly uneven distribution of the health workforce and the critical shortage of health-workers in world regions with a high disease burden. Medical brain drain refers to the mass migration of trained and skilled health professionals (doctors, nurses and midwifes) from low-income to high-income countries. The unequal distribution of the global health workforce is exacerbated by mass emigration of doctors and nurses fleeing from poor working and living conditions, and by the increasing recruitment activities of affluent nations.

Few dispute that medical brain drain presents a serious challenge for the healthcare systems of poor countries and raises important ethical questions. Despite the introduction of various policies at national and international levels, the trend is largely unbroken and more needs to be done if the harmful effects of medical brain drain are to be mitigated. Policy proposals to that end are, however, controversial, because they depend on how the underlying ethical conflicts are evaluated.

In this review, we present a brief overview of the data on medical brain drain, analyse the main ethical issues at stake, and employ them in the discussion of current policy proposals. We limit our focus to countries with critical staff shortages, that is, the most urgent cases in need of fair policy solutions. We provide an extensive review of the most recent literature, concentrating on empirical findings and ethical arguments that have appeared in the last 5 years.

The current situation

The health workforce is distributed highly unevenly around the world. In Africa, many countries have 0.2 or fewer doctors for every 10000 people, compared to 24 in the US, 27 in the UK and 30 in Australia [2]. The nurse to population ratio ranges from 1.1 to 10000 people in Somalia to 98 in the US and 101 in the UK. The WHO estimated that healthcare systems with less than 23 health-workers (doctors, nurses, midwifes) per 10000 people are unable to deliver essential health services [1]. There are 57 countries, mainly concentrated in sub-Saharan Africa (SSA), that fall below this sufficiency threshold and are considered to face 'critical shortages' in health workforce, in total amounting to shortage of 2.4 million health workers [1]. The problem of unequal health workforce density is compounded by the unequal distribution of the global burden of disease: Africa carrys 24% of the global burden of disease with only 3% of the world's health workers (the US carries 10% of the global burden of disease with 37% of the world's health-workers) [1]. In order to meet the United Nations' (UN) health-related Millennium Development Goals (MDGs), Africa would need a 140% scale-up of its health workforce [1]. Instead, some countries loose half to third of their doctors and nurses after graduation.

The Swiss situation

Medical brain drain is an issue not only in poor countries, which are the focus of this article. For example, Switzerland has almost 46 doctors and 108 nurses per 10,000 people, ranking among the highest density of healthcare workers in the world [1]. Nonetheless, the geographic distribution is unequal. There is internal brain drain, with health-workers largely concentrating in urban areas such as Zurich and Basel, leaving rural cantons such as Uri underserved.

Despite its decline in a few countries, health-worker migration is on the whole rising [3]. Organisation for Economic Co-operation and Development (OECD) countries are the main destination for medical migrants (47% go to the United States). In top Anglo-American destination countries, migrant doctors make up 22.5–39% of the national physician workforce [3]. Between 2001 and 2008 the number of foreign-trained fully registered medical doctors has increased by 70% in the US, 50% in Australia and 40% in Canada [3].

In absolute terms, Indian doctors and Philippine nurses make up the bulk of foreign-trained health workforce [4]. However, a better measure of the impact of medical brain drain is the *proportion* of emigrating health-workers compared with those that stay in their country of training. The regions most affected by high emigration rates are Africa and the Caribbean, with some countries exceeding 50%, such as Guyana (72%), Mozambique (65%), Sierra Leone (58%), Tanzania and Liberia (55%) [4].

Another way to look at medical brain drain is to calculate the loss in terms of the cost of training of emigrants. A recent study found that the total financial loss through doctors' emigrating ranges from $2.16 million for Malawi to $1.41 billion for South Africa, and adds up to a total loss of $2.17 billion for SSA [5]. Another study based on the cost of training plus the expected returns over 30 years of service estimated that Kenya loses $517,931 for every doctor and $338,868 for every nurse who emigrates [6].

Reasons for emigration, as reported by the migrant health-workers, are manifold. They relocate to improve their financial conditions, attain better job prospects (working conditions and career advancement), improve the security of their family, and ensure quality education of their children (e.g. [7]). Wage differentials are important driving forces behind migration (e.g. [8]), with wages 3–15 times higher in destination countries [9]. Lacks of professional opportunities and poor infrastructure have similarly strong effects on the intention to migrate (e.g. [10]). Inadequate hospital equipment, long and double shifts and heavy patient loads significantly contribute to health-worker burnout [11]. The more health-workers leave, the more serious these issues become, creating a vicious cycle. This is particularly relevant in SSA, where environments with high human immune deficiency virus (HIV) prevalence represent high risks and often excessive workloads for health-workers. (e.g. [12]). Overall, both working conditions and personal quality of life are perceived as far better in the destination countries.

Among the more general structural causes, war and civil strife are obvious, major push factors [13]. War has been found to double the expected physician emigration rate [14]. Lack of strategic planning in poor countries and long-term under-planning of health workforce and its education are also significant reasons, often due to both bad governance and scarcity of resources. In Mozambique, for example, a country with critical shortages, graduating nurses have to wait 4 years prior to employment owing to lack of financial resources to fund public jobs [15]. Financial and technical assistance by international organisations, non-governmental organisations (NGOs) and public-private partnerships can also have adverse effects. Instead of

providing funding for the general employment of health-workers, donor programmes with a particular focus on specific diseases are more likely to provide targeted drugs and equipment, specifically train local workers to donor-selected treatment or bring in international staff [11]. In addition, they may draw away local health-workers from the public health sector [16].

On the receiving end, in destination countries, increasing demand due to demographic factors coupled with inadequate planning and undersupply of human resources for health lead to shortages [17]. In the United States, for example, 17,000 medical students graduated in 2012 [18] and 24,000 residencies were offered [19]. The missing 7,000 residency positions had to be filled with foreign-trained medical graduates. Indeed, the supply of foreign-trained health-workers has been and continues to be taken for granted in policies of human resources for health [20, 21].

Effects of medical brain drain on health outcomes

The correlation between the availability of health workforce and health outcomes is a widely acknowledged fact [1]. Studies have found that the lack of skilled health-workers constitutes a major barrier to implementing health interventions that aim to improve maternal and child health, and to address HIV / acquired immunodeficiency syndrome (AIDS), malaria and tuberculosis [23, 24]. Critical health-worker shortages strongly affect the operation of public health systems and overburden existing staff, which in turn raises error rates in diagnosis and interventions [15]. Critical shortage may also undermine a country's capacity to absorb external funds and implement international programmes of health assistance [15, 25].

How to exactly substantiate the direct impact of health-worker emigration on mortality and morbidity is contested. Sceptics have pointed out that causal direct impacts of brain drain are difficult to show with absolute certainty. They argue that access to healthcare, and health outcomes in particular, depend on many other, arguably more significant, factors, and physician migration has a very limited role. "Internal brain drain" – the skewed distribution of health workforce from rural/public jobs towards urban/private jobs – and the inefficiency of public health workforce management are taken to explain better bad health outcomes in poor countries [14, 26].

These conclusions have in turn been called into question, as they do not take into account the potential impact of all ongoing health initiatives had the health professionals stayed [27]. To ascertain the net effect, more elaborate empirical research is necessary and calls for studies with longer time frames abound (e.g. [12]).

High-skilled emigration also has adverse impacts beyond having fewer service providers on the ground. It amounts to essential public resources wasted on education, less tax revenue from high earners, a diminishing pool of teachers and supervisors in medical training and education, declining quality of institutions and lost opportunities for political change. Such economic and institutional losses can profoundly impact overall institutional capacity for health-related development [28, 29].

Benefits of medical brain drain?

Remittances from emigrants are often cited as an important benefit of medical brain drain, thought to reduce poverty and encourage development. However, it has been argued that remittances are sent home in limited amounts, too small to compensate for the public investment in medical training and its expected returns over a medical career [28], and that the indirect and temporary benefits are not commensurable with the permanent losses [30], particularly in the long term [31]. Moreover, the countries most hit by the health-workforce crisis have a comparatively low share of remittances. The only exporter of health workforce among the top 20 remittance-receiving countries is the Philippines [30], an oft-cited exception with a surplus of health-workers to export on the global market.

Source countries are also thought to benefit from returning migrants and the related knowledge transfer. However, diaspora network efforts are voluntary and often limited to assisting new emigrants. Data also suggest that few migrants in fact return, and that targeted "return of talent" programmes to attract doctors and nurses to their country of origin either fail or come at a very high cost [30].

The real beneficiaries of medical migration are the destination countries. As noted by a recent report of the American Medical Association, "the entry of approximately 6,000 international medical graduates into the United States every year contributes a few billion dollars to the US economy, which is equal to the output of 50 additional medical schools without any cost to the taxpayer." [32] In the United Kingdom, medical education costs up to £250,000 ($460,000) per individual, whereas immigrant health-workers come at close to zero costs [33]. Packer et al. suggest that just the South African physicians registered in Canada in the 10 years after the apartheid saved the country $300 million [30].

Ethical issues

Is medical brain drain unethical?

It could be argued that while it obviously represents an unfortunate state of affairs for poorer countries, medical brain drain is not an ethical problem as such, or at least not more problematic than other forms of labour migration, which are usually tolerated or even welcomed. At first glance it might be seen as the morally neutral consequence of a globalising labour market and its competition for talent. The first question then is to ask whether, and if so how, health-worker migration differs in a relevant sense from individuals emigrating from India to work in US information technology (IT) or from Cote D'Ivoire to work in French manufacturing, sending home remittances and bringing knowledge and expertise when they return. There are at least three answers to this question, which we can only sketch here.

1. Global injustice: Medical brain drain is unethical because the underlying causes are unjust.

A simple yet effective answer is to point out that health-workers emigrating in droves from poor countries are a symptom of the underlying gross inequalities between rich and poor countries, which are a problem of global injustice.

Some contemporary global justice theories hold that extreme poverty or deprivation of human needs or capabilities should be addressed on grounds of our shared humanity (e.g. [34]), or as a duty to support global institutions that do not harm the poor [35]. Others argue that the gap between rich and poor nations should be constrained as the condition of fair global economic and political relations (e.g. [36]). In any case, medical brain drain is, in this view, unethical as the *symptom* of the underlying problem of global injustice, and populations of poor countries should not suffer detrimental effects on their healthcare because, and on top of, the fact that they are worse-off than rich countries. The main ethical obligation following from this line of argument is to work towards more global justice. Meanwhile, for those addressing more concrete problems, it also follows that symptoms of global injustice, such as medical brain drain leading to critical staff shortages, should be addressed as a matter of urgency [37, 38].

2. Human rights: Medical brain drain is unethical because it violates human rights

Another response is to point out that under article 25 of the Universal Declaration of Human Rights (UDHR) from 1948, everyone has "the right to a standard of living adequate for the health and well-being of himself and of his family", including medical care and particular care and assistance for children and mothers. Three of the eight UN Millennium Development Goals are also health related. While it may be notoriously difficult to specify what an "adequate standard" is, it could be argued that where populations are left with hardly any health professionals to provide even the most basic healthcare, this could be seen at least prima facie as a violation of their human rights, or at least as undermining governments' capacity to progressively realise the human right to health. This line of argument has some complexities we cannot discuss here, but for many it serves as a powerful explanation why health-worker migration, at least from the poorest regions of the world, is unethical [13, 39].

3. The importance of health: Medical brain drain is unethical because health is a special good that entails special responsibilities

Others take the view, sometimes implicitly, that medical brain drain is unethical because health is a special good and providing healthcare comes with special obligations. Arguments often focus on the fact that health is one of the most basic capabilities enabling individuals to pursue their life goals (e.g. [40]); or that health is necessary for individuals to take advantage of even the simplest opportunities in life [41]. Because sufficient health is a vital determinant of a decent life, maintaining health, by the institutions and individuals who are trained and capable of doing so, is seen as a more binding responsibility than ensuring there are enough IT workers around. Hence, brain drain leading to critical shortages of health-workers is seen as unethical. This view is in fact enshrined in most health professionals' codes, which recognise special responsibilities of medical professionals. It also underlies the public good perspective on health provision: healthcare, addressing the special good of health, is an important public good and a certain level of

health-worker density is necessary for the primary care of any population. Therefore, state institutions have a special obligation to maintain an adequate density of health workforce.

What are the specific ethical issues in medical brain drain?

It is thus fair to say that a broad consensus exists that when medical brain drain exacerbates critical staff shortages in vulnerable regions, it is unethical. Notwithstanding this general agreement, which policies to tackle brain drain are justifiable on ethical grounds and how to best go about implementing them remains highly controversial. It is therefore necessary to elaborate on two more specific ethical challenges and highlight their complexity.

Aggregate individual choices versus societal effects
On the one hand, when health-workers leave, they exercise their autonomy in pursuing their life plans [42]; the freedom to leave one's country and free choice of profession are codified as human rights in the UDHR. On the other hand, these individual choices raise important ethical questions at the societal level; their aggregate effect has harmful consequences for vulnerable populations and health systems. The question whether health-workers have a right to freedom of professional movement or whether this may be limited is one of the most central ethical conflicts underlying debates about medical brain drain [43, 44]. Those who claim an unconditional right to freedom of movement argue against any restrictions of emigration on an individual level. Others respond that health-workers have particular moral duties towards their society, which they fail to discharge when they leave behind a population in dire need. According to many, the global health crisis and its accompanying human resource crisis together result in such extreme health deprivations in certain parts of the world, that the human suffering and the lives at stake constitute sufficient grounds for limiting medical professionals' freedom of movement. Healthcare workers, given their special skills combined with local knowledge, are in a position to help and ease suffering in a very tangible way [45]. Against this one could argue that while health-workers have a professional obligation towards the sick, this duty is not tied to their country of origin – the duty to cure does not imply the duty to stay. There may be good practical reasons to favour local doctors with relevant local knowledge serving local populations, but any such requirement assumes a prior moral argument establishing a special duty to compatriots.

Arguments for such a duty to compatriots rest either on an idea of cost-benefit reciprocity, or on a broader idea of social justice (for details see [42]). On the reciprocity view, medical education involves public and social costs and graduates have a duty to "pay back" the benefits to the country that trained them, particularly in resource-poor settings where medical training involves a disproportionally high public investment. A broader version of this argument appeals to an idea of social justice, based on an understanding of society as a form of cooperation in which every member plays her part in providing social goods. When health-workers leave and health systems deteriorate, an es-

sential public good is jeopardised and privatised for personal benefit. Health-workers owe a duty of social justice to their training society, requiring them to play their part in the provision of social goods based on their acquired abilities [46].

Distribution of benefits and burdens and resulting responsibilities
The first section illustrated the harms and burdens for poor source countries that follow from medical brain drain. Destination countries, in contrast, benefit in several ways from medical brain drain: additional health-workers supplementing the national workforce without the cost and effort of full medical training, less need to scale up national medical education to meet growing demand; increased stability of healthcare provision; lower healthcare labour costs, with immigrant health-workers often receiving lower wages and benefits.

This distribution, where benefits accrue in those countries already far better off, but related severe harms are visited on poor countries and their populations, is considered clearly unethical by most, based on objections to harm, benefitting from harm and growing inequalities between countries. It has been called a form of "reverse foreign aid" or "de facto perverse subsidies" from the poor to the rich [29, 47]. Recruitment of health-workers from poor countries by rich countries has accordingly been labelled "theft" or "poaching" [48, 49]. In any case, destination countries that under-plan their health workforce and medical training capabilities, relying on foreign-trained professionals to fill systematic gaps in their staff, engage at least in so-called "passive recruitment" [50].

Against this view it has been pointed out that, because of the difficulty to calculate net effects of medical brain drain on health systems and outcomes, the argument that international recruitment is unethical fails [26]. As shown above, this view has been challenged as a result of the way it interprets data. But even apart from the question of demonstrating causality, international recruitment can be framed as a matter of justice. It is obvious that there are not just market forces at work in medical brain drain, but that institutional and policy choices in medical education, healthcare and immigration in destination countries have a strong impact [51]. The latest OECD report [52] summarily refers to medical brain drain as a "quick and inexpensive fix" for under-planning of work forces; with governments increasing recruitment, streamlining their immigration policies and tailoring their eligibility criteria for training in order to facilitate the entry of foreign graduates. At the same time, source countries do not receive any compensation for their loss of public investment. Even if recruitment did not have any significant effect on health systems and outcomes [26], which is highly doubtful, it could thus still be seen as unethical owing to the lack of distributive justice.

In sum, the strongest ethical imperative would be on the perpetrators of the harms – destination countries – to alleviate the burden on source countries; and indeed a number of proposals are discussed below how this could be done effectively.

However, the situation is complicated by the fact that source countries could be seen as coresponsible for the emigration flow. Countries investing into training medical students and failing to attach any requirement of service or repayment have been called at fault for making bad investments [53]. Moreover, the reasons for the failure to retain the national health workforce are at least to some degree under the control and responsibility of source country governments (the degree of responsibility will vary depending on whether these factors can be attributed to bad policy choices or to factors outside of government control, such as severe resource constraints, heritage of the past or conditioning by international incentive structures [35]).

Policy proposals

Notwithstanding a general consensus that medical brain drain needs to be addressed where it exacerbates critical health-worker shortages, it is far from obvious how the general ethical obligation to act translates into effective and proportionate policy. From an ethical point of view, where health systems and populations are directly harmed by avoidable conduct, mainly of rich destination countries, such conduct must be regulated and sanctioned. Which other policy interventions to prioritise, however, is a more challenging questions. Individual rights need to be balanced against societal demands, and harms done by source countries themselves should be factored in as well.

Destination countries and international interventions

Achieve self-sufficiency
Destination countries' failure to achieve a sustainable health workforce and their under-funding of medical education need to be addressed with urgency [17, 50]. The World Health Organisation (WHO) Global Code on the International Recruitment of Health Personnel [54] calls on destination countries to achieve self-sufficiency in human resources for health. Some worry that, unlike in a free international labour market, would-be emigrating doctors and nurses could lose what might be their only escape from dire working and living conditions [55]. Therefore, it is not enough to aim for self-sufficiency alone; instead there should be accompanying development assistance for source countries, to improve health systems and working conditions for local workers who otherwise might have legitimate aspirations to leave [11, 52].

Temporary work visas
These might provide a solution in this latter regard: They encourage the migration of medical graduates with the particular purpose to enhance their skills and knowledge, which eventually flow back to benefit the source community and its healthcare system [55]. Hence they offer a temporary option for those wanting to leave, which might benefit them personally, as well as a benefit for source countries upon return. Questions remain about potential coerciveness and enforcement policies of such visas.

Compensation for loss
Another proposal to address the problem of "reverse aid" is for destination countries to pay back the costs of educa-

tion or as much as is needed to replace a graduating doctor. Others suggest a compensation measure based on the gains each recruited health-worker means to the destination country [28]). Not all losses through brain drain are commensurable. Poor countries lose their "best and brightest" and their knowledge and quality of institutions are undermined [27]. Nonetheless, compensation schemes would go a long way to offset the harm done by medical brain drain.

Ethical recruitment
Various national- and international-level efforts have been made to adopt codes of practice for ethical recruitment, in which countries voluntarily commit to good conduct in the process of recruitment as well as refraining from recruitment from a list of vulnerable health systems with severe staff shortages [54, 56]. The effect of these codes is ambivalent and reception is mixed: Buchan et. al. [57] report a declining trend in health-worker migration after the introduction of the UK Code, but warn that trend data alone cannot demonstrate causality and other factors might be relevant (on the limits of ethical codes see also [58, 59]). Plotnikova recently pointed out that in public discussions and the practice of recruitment the rights of migrant workers seem to prevail over those of source populations [60]. Ethical recruitment has also been described as distorting a fair global labour market [55] or as a seemingly coercive measure [43] given that it constrains the professional choices of health-workers born or trained in critical regions. It might be preferable, then, to have mandatory self-sufficiency schemes in destination countries, which would make recruitment from poor regions less or even unnecessary in the longer term.

Source countries

Closing the wage gap
Closing the wage gap between source and destination countries would directly address one of the main causes triggering medical migration. There is recent evidence from Ghana that a wage rise might slightly reduce the outflow [61]. However, most source countries with critical shortages are hardly in a position to reduce the wage gap, let alone close it [3]. From an ethical point of view, beneficiaries, that is, destination countries, and perhaps the migrants themselves may be called upon to share the burden and channel their foreign assistance into financing jobs in public health systems (sometimes called "ethical foreign aid").

Training and improvement of health systems
Although financial assistance from destination countries is important from an ethical point of view, there is an onus on source countries to contribute as well. Mainly, poor working conditions need to be addressed, health systems strengthened, and education and training bolstered. There are encouraging signs of this happening, for example in South Africa [62], and official reports suggest that source countries are adopting various creative measures to scale-up and improve their health education [64]. However, as the OECD [3] notes, again sufficient improvement realistically cannot be realised without long-term financial support from the international community.

Staff retention measures

A number of proposals aim to retain staff, targeting especially remote rural areas that suffer most from critical shortages. *Targeted admission schemes* are based on empirical findings that health professionals from rural backgrounds are more likely to choose rural areas for their practice. *Clinical rotations* in a rural setting may also affect medical graduates' decision to work in deprived areas. Other measures include priority for doctors and nurses working in remote areas for professional development opportunities, such as faster promotion, training, fellowships, research grants, etc. [64]. All these are fairly unproblematic from an ethical point of view and should be supported. *Adapting curricula* [64] or *locally specialised medical training* [43, 45] to improve competences in rural health matters and in tackling locally relevant disease has also been suggested for resource-poor settings. Community-based, preventive, low-tech training is already practiced in Cuba, Venezuela and several African medical schools [43]. However, locally specialised medical training has been criticised for depriving doctors of relevant – emigration enhancing – skills, and could be seen as source countries curbing the opportunities and right to freedom of movement and occupation of their health-workers. Against this it has been argued that "local specialisation involves no threats, humiliation, or exploitation, it leaves acceptable alternatives open to candidates and it affects the options of only a small number of rather well-off citizens" [43]. As such it would on balance be ethically permissible, but the policy remains controversial. A less invasive approach would be to focus on the "hidden curriculum" in medical education, focusing on inducing social responsibility in medical graduates towards their local poor and ill. This avoids the concern about coercion and would therefore be preferable; however, such "soft" educational reform takes time and might not be effective unless other policy intervention address the powerful financial incentives for migration currently in place.

"Return of talent" programmes

These programmes have been adopted in several countries (e.g. Ghana, Zimbabwe). Empirical studies suggest that they are very costly and the number of returnees is low. Few medical emigrants want to return, especially when the reasons why they left are still there. Moreover, incentive schemes, which include higher remuneration, might have undesirable effects on intrasocietal income differences. Those professionals who stay behind and see themselves as loyal to their country of origin taking the burden of staff shortages might feel unfairly treated by their government [30].

Exit requirements

A powerful tool to stop medical graduates from emigrating, at least for a short period, is a *compulsory service requirement* made part of their degree. Seventy countries currently apply (or have in the past) some kind of compulsory service requirement. In some cases, such as in India, this has faced strong local protest (cited in [65]). Another option is *tax burdening* the emigrating health-workers to recoup the costs of their medical training. Both types of exit requirements raise some issues from an ethical point of view, such as how to determine fairly the length of mandatory service or how much migrants should be expected to pay. Secondly, as isolated measures they would shift the burden of compensation for medical brain drain towards migrants only, while destination countries and their populations benefit freely. Finally, exit requirements have been regarded as the most coercive towards health-workers, violating their autonomy, right to freedom of movement, and professional and personal choice (e.g. [64]).

Conclusion

In this review we have shown that while medical brain drain presents an urgent problem and general ethical arguments can be made to address it, some ethical conflicts complicate the picture, such as the conflict between individual rights of health-workers to move and the societal need for them to stay. These conflicts make it challenging to develop "ideal" policy interventions. However, we pointed out several options that are more or less straightforward from an ethical point of view, at least under nonideal circumstances. A promising strategy seems to be one of "escalating" policies, starting with the uncontroversial ones, and taking into account variations between countries. A multilayered way with several interlocking policy options that work towards the same goal would be best, where undesirable effects on the rights of individuals can be minimised as much as possible and other negative consequences of intervening in the migration flow, such as a reduction of knowledge transfer, can be minimised.

Where critical shortage exists, targeted development efforts to improve working and living conditions in source countries, as well as compensation for loss incurred (at least in terms of education) are uncontroversial first-step policies. They are however challenging to implement and therefore need far stronger recognition and support within the international debate. Other first-step policies are efforts to instil loyalty through the "hidden curriculum" in source countries. Second-step policies are those that would decrease the flow of migration by reducing demand. Source countries should devote more investment to improving their health systems, scaling up education and introducing measures to make staying more attractive to their local work force, so that the push-factors for brain drain are reduced. Destination countries should make enforceable commitments not to recruit from countries with critical shortages as well as strong efforts to become self-sufficient in their health workforce, thus minimising the pull-factors. This should be coupled with the aforementioned financial and development assistance for source countries, to help improve local working conditions and build capacities in local health systems. If conditions in source countries improve without sufficient impact on migration flow, restriction of movement through staff retention measures can be discussed as a third-step policy intervention. In all this it is vital to be aware that national levels are important but insufficient for effective policy implementation owing to collective action problems, and lack of continuous financing and binding governance tools. Some therefore suggest setting up a Global Health Resource Fund to provide continu-

ous funding and coordinated global governance in addressing medical brain drain [66].

Finally, the search for novel ideas to address medical brain drain should be continued. For example, a recent innovative model called "third-country development" envisages health-workers who have emigrated from the Global South being mobilised for humanitarian work on a mission in another country that has critical shortages. In effect, this would be a temporary migration scheme establishing a sort of "international health-keeping corps" [67]. Motivation might be a problem for this model, but it points towards some as yet unexplored potential to address medical brain drain.

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