

Round Table

Strategies to discourage brain drain

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Abstract Building health research expertise in developing countries often requires personnel to receive training beyond national borders. For research funding agencies that sponsor this type of training, a major goal is to ensure that trainees return to their country of origin: attaining this objective requires the use of proactive strategies. The strategies described were developed under the extramural acquired immunodeficiency syndrome (AIDS) International Training and Research Program (AITRP) funded by the Fogarty International Center (FIC) at the National Institutes of Health, United States. This programme supports universities in the United States that provide research training to scientists from developing countries to enable them to address the global epidemic of human immunodeficiency virus (HIV)/AIDS and the related tuberculosis (TB) epidemic. This paper describes the strategies employed to discourage brain drain by the principle investigators (PIs) of five of the longest-funded AITRPs (funded for 15 years). Long-term trainees in these programmes spent from 11 to 96 months (an average of 26 months) studying. Using scientific, political and economic strategies that address brain drain issues, PIs working in AITRPs have attained an average rate of return home for their trainees of 80%.

Keywords Research personnel/supply and distribution; Brain drain; Emigration and Immigration; Biomedical research/education; Training support/organization and administration; Research support; Health priorities; HIV infections; Developing countries; Developed countries (*source: MeSH, NLM*).

Mots clés Personnel de recherche/ressources et distribution; Exode des compétences; Emigration et immigration; Recherche biomédicale/enseignement; Aide enseignement/organisation et administration; Priorités en santé; Infection à VIH; Pays en développement; Pays développé (*source: MeSH, INSERM*).

Palabras clave Investigadores/provisión y distribución; Exodo intelectual; Migración internacional; Investigación biomédica/educación; Apoyo a la formación profesional/organización y administración; Prioridades en salud; Infecciones por VIH; Países en desarrollo; Países desarrollados (*fuentes: DeCS, BIREME*).

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Introduction

Trained scientists are needed in every part of the world. However, the better standard of living and quality of life, higher salaries, access to advanced technology and more stable political conditions in developed countries often attract scientific talent from less developed areas. This phenomenon, known as the "brain drain", is not new. However, as scientists have increasingly recognized the importance of having capable partners worldwide, certain programmes have established strategies to stem the tide of migration of highly skilled people out of developing countries.

Given the borderless nature of disease and the international and interdisciplinary nature of current scientific research, international collaborations are key to addressing global health issues. Epidemics, such as those of severe acute respiratory syndrome (SARS) and acquired immunodeficiency syndrome (AIDS), highlight the need for qualified scientists throughout the world to signal problems and work together on producing solutions.

The issues surrounding brain drain are complex. For developing countries, scientific trainees who fail to return are a drain on the economy and on capacity building. On the other hand, expatriates send home money that they earn, thus contributing to the developing nation's economy. While abroad, they can contribute to scientific advances of importance to their home country and serve as mentors for other trainees.

A developed country may view itself as providing a refuge for those who would encounter political unrest and economic hardship at home. The developed world has its own shortages of skilled people in specific fields and can drain a developing country of expertise by providing job opportunities.

Some factors cited by researchers from developing countries as reasons for not returning after training include: lack of research funding, poor facilities, limited career structures, poor intellectual stimulation, threats of violence and lack of good education for children in their home country (1). However, not

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all the factors involved in brain drain can be addressed by science-funding agencies (e.g. research funding): some, such as violence, are outside their sphere of influence. Some strategies proposed to encourage trainees to return home, used by PIs of the AITRP funded by the Fogarty International Center (FIC) at the National Institutes of Health in the United States, are described below.

Strategies to address brain drain

Programmes supported by the FIC, which funds research training programmes for scientists from low- and middle-income countries with the goal of building local expertise to conduct research in developing countries, use a variety of strategies to encourage scientists to return home after training. One programme using these strategies is the AIDS International Training and Research Program (AITRP). The AITRP supports universities in the United States that provide research training to scientists from developing countries to enable them to address the global epidemic of HIV/AIDS and the related epidemic of TB. The FIC awards 5-year institutional training grants through the AITRP. Individuals from developing countries who wish to become trainees under the AITRP must apply directly to the PI in charge of an awarded grant, using the application process instituted by the PI. For the purposes of this study, long-term trainees were defined as trainees who were sponsored by an AITRP study for their master's degree or doctorate or held post-doctoral positions. The PIs of the AITRP must use strategies that encourage scientist-trainees to return home after training to accomplish an AITRP goal: this is to establish, in developing countries affected by HIV/AIDS and TB, the critical biomedical and behavioural science research expertise needed to address the global epidemic of HIV/AIDS and the related TB epidemic.

During the summer of 2002, the FIC conducted a survey of five of its longest-funded research training grantees under the AITRP. Each of these programmes had been funded for three, 5-year grant cycles (15 years). Given a list of 14 possible strategies, the PIs indicated which of these strategies they had used to make a trainee's return to his or her home country more probable. One or more PIs had used each of the strategies listed below; all PIs used a combination of strategies. Data from 186 long-term trainees on five AITRPs were used to calculate an average return rate of 80%. Trainees spent from 11 to 96 months training; an average of 26 months.

Scientific strategies

Research is responsive to priorities in the home country

An AITRP PI works with his or her colleagues in developing countries to determine their priority areas of research. By working in these high-priority areas, trainees in the programme are more likely to find support in their home country to continue working in the area in which they were trained.

Training-related research is conducted at home

By maximizing the amount of research training conducted in the home country, AITRP minimizes the time a trainee spends abroad. This is sometimes called "sandwich training" — the beginning and end of the training period take place in the host country institution whereas the middle third takes place at an institution in the home country. Carrying out the research at home, near family, friends and colleagues, places the trainee in a better position to find a job and funding after completion of the training.

Strategic in-country trainee selection

Collaborators and home-country institutions are involved in the training and selection process. In addition to selection criteria (such as test scores and proficiency in English) some PIs found trainees were more likely to return to their home countries if they were members of the institutions involved in the collaboration.

Strong mentoring in the United States and in the home country

Having a mentor both in the United States and in the home country is important. The mentor in the home country provides the necessary administrative, political and scientific support for a trainee. Ideally the mentor in the United States and the mentor in the home country will have a long-term scientific relationship that can provide research, training and scientific support.

Equipment support

The AITRP provides some funds for the purchase of computers and the laboratory equipment necessary to accomplish research goals. At sites where other research supported by the National Institutes of Health is conducted, additional equipment and opportunities may be available for the trainees.

Journal and Internet access

During the training period, the AITRP trainee has access to up-to-date medical journals and the Internet. Once training is over, the programme may allow the trainee to keep an email address and to have access to journals through the institution in the United States.

Professional networking support

The PIs who have established a network among their current and former fellows and mentors have found that this provides vital long-term support to trainees returning home. The AITRP network meetings are held regularly and include discussion about how to reinforce the relationships between trainees, PIs and mentors. The AITRP trainees also meet at international conferences.

Re-entry funding

Trainees have had opportunities to apply for funds (US\$ 25 000) to support their "re-entry" research projects as part of the AITRP grant. These awards provided bridge funding for the trainee upon returning home and allowed them to continue their research and to begin to establish themselves as independent researchers.

Support with writing grant applications

Successfully competing for funding can provide a trainee with the resources and the foundation on which to build a research laboratory. The AITRP may hold seminars on writing grant applications and many mentors provide advice and examples for their trainees.

Political strategies

Temporary visa

The AITRP trainees come to the United States under non-immigrant temporary visas. Most PIs will not support extension or renewal of these visas, thus preventing prolongation of trainees' stays in the United States.

Return agreements

Trainees are asked to sign a “condition of appointment” or return agreement prior to training that can be a valuable tool in encouraging them to return home.

Training for decision-makers in developing countries

Educating decision-makers about the importance of health research is an important step towards increasing the probability that such research will become a political priority. Short-term courses are the most appropriate method for training these decision-makers. This training should make administrators more aware and supportive of scientific research training, thus enhancing the environment to encourage talented people to return home.

Economic strategies

Repayment agreements

Some AITRP PIs require their trainees to sign repayment agreements stating that if trainees do not return to their home country, they will be responsible for repaying the cost of their training to the United States institution.

Letters of future job support

Some AITRP PIs require that trainees have positions in the field in which they were trained upon returning home. They do this by obtaining a letter of support from the sponsor in the developing country that describes potential positions that will be available after training.

Results and discussion

There are no good comparison groups for the average rate of return home of 80% reported for the 186 AITRP trainees who

came from 38 different low- and middle-income countries. However, the National Science Foundation, in their 2004 Science and Engineering Indicators Report, stated that, in 1998–2001, 54% of international science and engineering PhD students in the United States accepted firm offers to remain in the United States after receiving their degree (return rate of 46%). In another study, a return rate of 44% was reported for African students who were studying for a PhD in health sciences in Canada and the United States (2).

The AITRP has served as a model research-training programme for the FIC. However, there is no “one-size-fits-all” strategy available to counteract the complex phenomenon of brain drain. Furthermore, some aspects of the AITRP are unique. For example, because research on HIV/AIDS currently attracts a substantial amount of national and international funding, a trainee in this field may find it easier to obtain research funds and develop mentor networks. Also, because this research area is a high priority for the governments of many developing countries, jobs for trainees may be more easily secured upon their return to their home countries.

Clearly, everyone involved would benefit from a coordinated planning effort to reduce brain drain and to mitigate its effects. Further efforts are needed to engage representatives of all sectors, including the trainees themselves. Interested parties should meet to discuss this issue, to exchange “best practices” and to develop a comprehensive action plan. In addition to addressing a trainee’s physical return, it is essential to identify novel ways (e.g. partnerships, networks, alumni associations and virtual communities) that would achieve the “critical mass” of scientists required to provide the collegial community that is so important to retaining quality researchers in any country. ■

Conflicts of interest: none declared.

Résumé

Stratégies destinées à décourager l'exode des compétences

Pour acquérir des compétences en matière de recherche sanitaire, les personnels des pays en développement doivent souvent se former à l'étranger. Pour les organismes de financement de la recherche qui parrainent ce type de formation, un des buts majeurs est d'assurer que les chercheurs qui bénéficient d'une bourse de formation retourneront dans leur pays d'origine. Pour atteindre cet objectif, il faut faire appel à des stratégies qui prennent ce problème en compte dès le départ. Les stratégies décrites dans le présent article ont été élaborées dans le cadre du programme AITRP (programme international de formation et de recherche sur le SIDA (syndrome d'immunodéficience acquise)) destiné aux étudiants et chercheurs étrangers et financé par le Fogarty International Center (FIC) aux National Institutes of Health (Etats-Unis d'Amérique). Ce programme soutient les universités des Etats-Unis qui proposent

une formation à la recherche à des étudiants et chercheurs des pays en développement afin de leur donner les compétences nécessaires pour faire face à l'épidémie mondiale de VIH (virus de l'immunodéficience humaine)/SIDA et à l'épidémie de tuberculose qui l'accompagne. Le présent article décrit les stratégies employées par les responsables des programmes de recherche de cinq des AITRP les plus longs (financés pour 15 ans) pour décourager l'exode des compétences. Les bénéficiaires d'une bourse de longue durée dans le cadre de ces programmes sont restés pendant 11 à 96 mois (moyenne : 26 mois). En appliquant des stratégies de lutte contre l'exode des compétences reposant sur des bases scientifiques, politiques et économiques, les responsables des programmes AITRP ont obtenu un taux de retour des boursiers dans leur pays d'origine de 80 %.

Resumen

Estrategias para desalentar la fuga de cerebros

La ampliación de los conocimientos técnicos en materia de investigaciones sanitarias en los países en desarrollo exige a menudo que el personal de esos países reciba formación en el extranjero. Para los organismos de financiación de investigaciones que patrocinan este tipo de capacitación, un objetivo fundamental

es asegurar que las personas formadas regresen a su país de origen, y para lograr ese objetivo hay que emplear estrategias preventivas. Las estrategias aquí descritas se formularon en el marco de una iniciativa en régimen de enseñanza libre conocida como el Programa Internacional de Capacitación e Investigaciones

sobre el síndrome de inmunodeficiencia adquirida (SIDA) (AITRP), financiado por el Fogarty International Center (FIC) en los Institutos Nacionales de Salud (EE.UU.). Este programa apoya a universidades de los Estados Unidos que imparten formación investigadora a científicos de países en desarrollo para que puedan hacer frente a la epidemia mundial del virus de la inmunodeficiencia humana (VIH)/SIDA y a la tuberculosis asociada a la epidemia. En este artículo se describen las estrategias que para desalentar la fuga

de cerebros emplean los investigadores principales (IP) de cinco de los AITRP financiados durante más largo tiempo (15 años). Las personas que participaron en estos programas invirtieron en sus estudios entre 11 y 96 meses (26 meses como media). Valiéndose de estrategias científicas, políticas y económicas que abordan el problema de la fuga de cerebros, los IP que trabajan en los AITRP han logrado una tasa media de regreso al país de los cursillistas

ملخص

استراتيجيات للحد من هجرة العقول

البلدان النامية، لتمكينهم من التصدي للوباء العالمي لمرض الإيدز والعدوى بفيروسه ووباء السل المرتبط بالإيدز. وتصف هذه الورقة الاستراتيجيات المتبعة للحد من هجرة الباحثين الرئيسيين الذين شاركوا في خمسة من أطول البرامج الدولية للبحوث والتدريب في مجال مرض الإيدز (التي استمر تمويلها مدة ١٥ عاماً). وقد أمضى المتدربون في هذه البرامج الطويلة الأمد من ١١ شهراً إلى ٩٦ شهراً من الدراسة (بمتوسط ٢٦ شهراً). وأدت الاستراتيجيات العلمية والسياسية والاقتصادية للتصدي لقضية هجرة العقول إلى وصول المعدل المتوسط لعودة الباحثين الرئيسيين المتدربين في هذه البرامج إلى بلدانهم، إلى ٨٠٪.

الملخص: عادة ما يتطلب بناء خيرات العاملين في مجال البحوث الصحية في البلدان النامية حصولهم على التدريب خارج بلدانهم. ويتمثل أحد الأهداف الرئيسية للوكالات الممولة للبحوث، التي ترعى مثل هذا النمط من التدريب، في ضمان عودة المتدربين إلى بلدانهم لدى انتهاء التدريب. غير أن تحقيق هذا الهدف يستلزم تطبيق استراتيجيات استباقية. وقد تم وضع الاستراتيجيات التي تناولها هذه الدراسة وفقاً للبرنامج الدولي للتدريب والبحوث خارج الجامعات في مجال مكافحة مرض الإيدز، الذي يموله مركز فوغارتي الدولي في المعاهد الوطنية للصحة في الولايات المتحدة. ويقدم هذا البرنامج الدعم للجامعات الأمريكية التي تقدم برامج تدريبية على إجراء البحوث للعلماء من

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Round Table Discussion

Effectiveness of strategies for discouraging brain drain

Anna Whelan¹

The paper by Kupfer et al. raises an issue of great public health importance, namely, scientific brain drain, and describes how the authors' institution had developed strategies to stem it. The situation they describe is part of the larger issue of migration of skilled labour from low-income countries to high-income countries, commonly referred to as brain drain, which has been recognized internationally since the 1960s (1). Most of the studies on this topic have focused on the medical workforce, including nurses (2, 3), and less is known about flows of other health personnel such as research scientists, academics, laboratory technicians, radiographers. The magnitude of this problem for scientists and its impact on public health were not discussed by Kupfer et al; however, the available data relating to the migration of health personnel have recently been reviewed by the Regional Network for Equity in Health in Southern Africa (EQUINET) (4).

Kupfer et al. describe the approach taken by their institution, which for the five programmes they surveyed, resulted in a return rate for trainees of 80% (n = 186). It is unclear where

these trainees came from, whether they were able to utilize their new skills on their return home, whether they were satisfied with a range of factors (e.g. employment conditions and lifestyle) on return, and whether they remained in their home countries thereafter or subsequently migrated. Medium- and longer-term follow-up of trainees would provide useful information on which to base further action.

The paper by Kupfer et al. lists 14 strategies that had been used to "make a trainee's return to the home country more probable". While the results of this package of initiatives were impressive, an evaluation of the benefit of each of these strategies separately would provide other similar institutions with valuable information. Is there one particular strategy that is more effective, or are all 14 needed to improve the likelihood of return to the home country?

The first strategy listed, i.e. that "research is responsive to home country priorities", seems to be the linchpin. This is a sensitive issue that lower-income countries often find difficult to negotiate because these countries may be under pressure to make their priorities fit those of the external agencies. A key question is who is the initiator of the research proposal? If the trainee is to be supported to return home, then having a research agenda that genuinely reflects the priorities of his or her country is a fundamental requirement. For example, if the research is considered marginal, or beyond the capacity of the institutions of the home countries, the trainees may face frustration on return, and seek to emigrate so that they can utilize their new skills elsewhere. In other words, the issue of recognition of

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the value of their work by their own governments and research institutions would be worth addressing.

The “sandwich training” model has been shown to be a highly effective postgraduate educational method; however, it is important that trainees are able to focus on their research and need not do double duty, returning to their regular work, while also trying to complete their research. Appropriate selection of trainees is clearly crucial, and one of the features identified as assisting in encouraging return, i.e. “a history of institutional collaboration”, is worth highlighting. Providing equipment, access to journals and the Internet, and small re-entry grants appear to be practical strategies that could facilitate continuing research in lower-income countries. Low-cost measures such as networking, support with writing grant applications and mentoring strategies also appear useful. The appropriate political and economic strategies will vary between countries and are subject to change. For example, the previous strict restrictions on student visas in Australia have recently been modified to allow skilled personnel to remain for a period in Australian “areas of need”, such as in rural and remote areas, after they have completed their studies.

Although the information given by Kupfer et al. provides an excellent starting point for institutions training scientists and other skilled health personnel in considering how to tackle brain drain, the “pull” factors such as shortages of particular skills in affluent countries, may work against them. Overseas recruitment schemes and recruitment agencies are likely to counter the strategies proposed. Further work is required at many levels, including that of macro-policy, to understand and stem the negative impacts of the brain drain.

Research is being carried out by a global network, under the umbrella of EQUINET and coordinated through Health Systems Trust South Africa, with a consortium of institutions in Australia, Canada and the United Kingdom, aimed at developing policy options that will assist wealthier countries in implementing “ethical recruitment” (5). The institutions include: Public Health Association, Australia; School of Public Health and Community Medicine, University of New South Wales, Australia; Saskatchewan Population Health Research Unit, Canada; University of British Columbia, Canada; University of Toronto Centre for International Health, Canada; Department of Community Health, Malawi; Health Systems Trust, South Africa; University of Western Cape, South Africa; Medact, United Kingdom; EQUINET, Training and Research Support Centre (TARSC), Zimbabwe; and Public Services Association, Zimbabwe.

This global programme of work is exploring the complex “push”, “pull”, and “stick/stay” factors that affect the migration choices of professionals in health and other fields (6, 7). ■

Conflicts of interest: none declared.

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Managing the return and retention of national intellectual capacity

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There is a migration crisis in the health sector in Africa, but it appears that many sub-Saharan African countries have not been able to establish a strategy for managing brain drain (1). Actions in response to brain drain are apparently ad hoc and are not comprehensive. Indeed, it is not clear if any national strategies for managing human resources and intellectual capacity exist beyond the broad education policies and some human resource plans in individual sectors. Thus perhaps a key area that would assist developing countries in ensuring the return of nationals who have trained abroad would be to strengthen government institutions and local research institutions to develop strategic options and create the long-term support systems that would complement the return strategies discussed by Kupfer et al.

Recently, the Rockefeller Foundation in collaboration with WHO and the World Bank have supported a “Joint learning initiative” aimed at assessing global issues and problems related to human resources for health. One of the working groups focused specifically on the problems in Africa (2). One subject of the discussions arising from this working group’s review of human resources for health in Africa, was the initiatives being taken by the New Partnership for African Development (NEPAD), in conjunction with the African Union and other organizations such as the International Organization for Migration (IOM), to encourage some changes in the way migration is viewed and to garner the resources generated by African nationals living outside Africa. These would include not only remittances and investments in the country of origin, but also the creation of intellectual and scientific networks that nurture and support local development of science, industry and commerce (3).

It has been noted that although the brain drain undeniably has serious negative effects, these may be turned around to benefit migrants’ home countries if managed well. This raises the question: “when is an intellectual of more use to his or her country of origin than to a country at the receiving end of the brain drain”? This is a difficult question that many sub-Saharan African countries are now grappling with. It may be argued that where the loss affects core services by taking away health professionals and other general service providers deemed essential to a country’s well-being, there are certainly negative effects. However, some training and skills gained abroad may really be more appropriate and better applied in developed countries than at home.

Retention, motivation and utilization of top scientists and researchers depends not only on the existence of a certain, sometimes sophisticated, infrastructure, but also on adequate

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and sustainable resources that are often beyond the scope of many governments in sub-Saharan Africa, given the other major economic and social responsibilities they face.

The strategies tested by the Fogarty International Center at the National Institutes of Health described by Kupfer et al. are laudable and generally positive. The question remains as to whether such programmes can be scaled up and accepted by all major agencies and whether such return programmes could be sustained once the specific research interest that necessitated scientists returning to a developing country (i.e. the institutional interest) ends.

Difficulties also arise in determining what the true priorities of a particular country are relative to those established by, or of interest to, the international research agency. A good response to these local priorities by international research agencies will ensure better governmental and institutional responsiveness to such programmes.

There is no doubt that human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS) is a priority in every country, but its multi-factorial complexity creates many different aspects that need to be addressed, some of which may not be as important to an external scientific organization as to the home government. Secondly, the flood of support to a single area of “priority” means that other pressing scientific needs are neglected.

In practical terms, sandwich training is useful provided that other necessary support, such as that used to encourage all (non-sandwich) trainees to return home, is also in place for sandwich trainees. It would be useful to determine what the long-term retention of such sandwich trainees is.

How can research interest and funding in developing countries be sustained in order to attract the best brains? Funding for project-specific programmes is often available only for a limited period of time (3–5 years) and periods when funding is scarce may demotivate scientists. Is there room for a system where grant agencies and international institutions contribute a proportion of grant funds to a generic national research fund that enables bridging funds to be made available in the absence of projects and encourages research that is based entirely on local priorities?

On the whole, the paper by Kupfer et al. is representative of the actions institutions in developed countries can take to assist trainees to return to their countries of origin. But the decision as to whether or not to return also depends, even when all the incentives and systems deployed by the training institution are taken into account, on the “political” factors described by Pang et al. (4). Governance of local research institutions, perceptions of fairness of academic and career progression opportunities, general optimism regarding progress in the country as a whole and the outlook for one's family and children's future are significant factors in determining whether professionals stay at home. ■

Conflicts of interest: none declared.

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Strategies to manage migration of health professionals to protect national health systems will be successful only if all stakeholders are involved in the process

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Within the framework of sustainable development the need to build national capacity in developing countries has been widely recognized and the international donor community has committed considerable resources to achieving this goal. Ensuring that those trained abroad do return to their countries of origin has become a major challenge for all stakeholders concerned. In this regard the apparent success of the strategies reported by Kupfer et al. to encourage the return home of health experts trained abroad is encouraging.

However, the discussion presented falls somewhat short with regard to details of the sustainability of the measures suggested. Repatriation of professionals in itself is not sustainable if retention is not addressed appropriately. That retention of skilled personnel is rather difficult is demonstrated by the fact that the various regional and global strategies that have been adopted (1, 2) seem to have been unable to satisfactorily stem the outflow of highly qualified professionals (3–5).

Furthermore, the development of appropriate strategies is quite often hampered by the fact that most national governments, particularly those of the source countries, have difficulties in monitoring the inflow and outflow of migrants (6).

Because of the growing demand for health professionals in the developed world that cannot be met by the domestic labour market, wealthy countries will inevitably continue to draw on the human resources of the less developed world. To facilitate such movements, regional and global agreements (such as the Free Trade Area of the Americas (FTAA), General Agreement on Trade in Services (GATS) (particularly Mode 4), and the Caribbean Single Market and Economy (CSME) in the Caribbean Community (CARICOM) framework) on the free movement of labour, together with fast-track immigration procedures in the receiving countries that target people with the required skills, are being put in place. These agreements are, however, hampering efforts to protect the poorer countries from the loss of their skilled workers.

Against the background of continued international mobility of professionals, the responsibilities of both the source and the recipient countries need to be made explicit before a consensus can be reached on viable solutions to the problem that would take into account the needs of all partners concerned. In this regard, the following issues should be further considered.

- Migration of professionals should be monitored and managed. Measures agreed by both sides should be adopted, and structures for their enforcement need to be put in place.

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- Training programmes for professionals should be designed according to the needs identified in their country of origin and the national administrations need to be held accountable for the re-integration of the returning professionals into the national health system.
- More efforts are required to convert the brain drain into a “brain gain”. In the academic community long-term partnerships should be established between institutions at home and abroad (7).
- Ethical codes of conduct for the public and the private sector should be adopted and adherence to them strictly enforced to protect the health systems of the most seriously affected countries.
- At the global level more collaboration is needed between economic and trade groups and migration policy-makers to ensure inclusion of migration issues into global frameworks of trade in services.

Continued failure to build national capacity will continue to have severe consequences for the poorer countries, since the lack of skills will prolong their dependence on foreign development assistance. ■

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The challenges of capacity building in science in a global labour market

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Although my concern with the brain drain has been limited to the migration of professionals in the health service (1), I received the paper by Kupfer et al. while on an assignment at a medical school in a sub-Saharan African country in which the attraction and retention of highly qualified (national) academics is a serious

issue. The paper was therefore highly relevant to my assignment, and from my perspective provided a welcome extension of the debate on the brain drain.

The article reveals a complex set of stakeholder interests: those who want to tackle global epidemics such as severe acute respiratory syndrome (SARS) and acquired immunodeficiency syndrome (AIDS) using the best possible scientists available; those who work in academic institutions whose core business is research and training; potential migrants looking for better jobs; those who benefit from remittances sent by the migrants; and the scientific community in developing countries in need of the additional expertise. However, in relation to the article by Kupfer et al., the last of these groups is of the greatest interest, especially as according to the web site of the AIDS International Training and Research Program (AITRP), the first objective of their programme is to “establish critical biomedical and behavioural science expertise in developing countries affected by human immunodeficiency virus (HIV)/AIDS and tuberculosis (TB)” (2).

A review of the AITRP in 1996 reported that almost all capacity building of AIDS professionals had actually taken place in-country (28 000 foreign health professionals were trained in their own countries) whereas only a very small proportion — 1000 foreign scientists (approximately 3%) — studied in the United States (3). The concern is for the small number of health professionals who have continued to be trained overseas: they are effectively being “trained into” a global labour market of scientists. On entering this labour market they may choose to work in countries other than their own, thus jeopardizing the achievement of the programme’s first objective.

Nevertheless, the AITRP’s rate of 80% of trainees returning to their own countries is impressive. The strategies used to tempt trained workers to return to their home countries and subsequently to retain them, broadly address key workplace “push” factors (4) (inability to do the job they have trained for leading to lack of job satisfaction) — although these solutions are largely short-term — and are complemented by strategies that use leverage and sanctions, e.g. repayment, return agreements and visa restrictions. In the sub-Saharan area where I was on assignment, the major “pull” factor working against retention of trained workers was the salary differential between the overseas and home employers. This resulted in an inability of those employed in their home countries to support a lifestyle considered commensurate with their skills, or to provide an adequate level of education for their children. This may be less of a problem for those who work in the area of HIV/AIDS, which — as mentioned by Kupfer et al. — is relatively well funded. But insufficient remuneration is a serious problem in equally important but less well funded areas of health.

Kupfer et al. provide a useful model of a comprehensive strategy to improve the return and subsequent retention of trained workers from which other similar schemes could benefit. In opening up the debate, the article also raises some further questions relevant to all such enterprises.

- How long did the returnees stay in their home country? They may have stayed for a few years while benefiting from start-up support, avoiding repayment of training costs and getting round the re-entry restrictions linked to certain types

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of visa. In such cases, the home country will only have received marginal benefit. The 1996 review of the AITRP courageously proposed a 10-year follow-up period, though this is notoriously difficult to achieve, and the AITRP has done well to do the follow-up reported by Kupfer et al.

- Could similar training be provided regionally? From interviews I conducted in the medical school in sub-Saharan Africa, which was investing heavily in staff development, the risks of non-return appeared to be higher for those trained outside the continent than for those trained within the region. As research institutions in the developing world become stronger, the possibility of using them as a regional training resource should be kept under review especially for programmes aiming primarily to build up national capacity. ■

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Brain drain: rethinking allocation

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Kupfer et al. outline the results of a survey of five of the longest-funded research training grantees under the acquired immunodeficiency syndrome (AIDS) International Training and Research Program (AITRP), which examined the effectiveness of a series of strategies that the Fogarty International Center at the National Institutes of Health had put in place to encourage trainees to return to their home countries. This research found that for the programmes surveyed there was an average rate of return of 80% for a period of 15 years, which is higher than that reported for many other research programmes.

Although this article provides a useful outline of the strategies that were used to encourage trainee scientists to return to their home countries, there are a number of issues that were not addressed. It is interesting that the topic of research was AIDS. Although one of the professional strategies adopted by the Fogarty International Center was to make the principal investigator in

the United States work with developing countries to ensure that the research is responsive to the priorities of developing countries, there was no questioning of whether international centres for AIDS research should always be located in the United States or whether the needs of AIDS research would be more easily met by decentralizing research centres to developing countries. This would provide a different framework for looking at research capabilities and investments. It would also help to address the research priorities of developing countries more effectively in terms of both funding allocation and research capacity development; these issues are currently being highlighted by the Council on Health Research for Development (COHRED).

Kupfer et al. specifically address research expertise. It is worth considering too whether any of the strategies they describe have also been used to encourage health workers to return to their home countries. Two of the key reasons why both researchers and health workers choose to move to developed countries are the low salaries and poor facilities in the home country. Persuading decision-makers in developing countries to recognize the importance of health research cannot be effective unless there are adequate sources of funding and investment in infrastructure available. Some of the strategies listed by Kupfer et al. are useful for encouraging both researchers and health workers to return to their home countries: e.g. mentoring and access to journals and the Internet, but such strategies still fail to address the lack of allocation of international research funding to developing countries, or in the case of health workers, the lack of investment in public health-care systems.

It is also important to recognize that although the value of remittances sent by workers abroad to their home countries often contributes significantly to the gross domestic product of a developing country (one of the arguments in favour of brain drain/gain), most of the investments from health workers are in private rather than public facilities. In this sense the training investment made by the developing countries is not recouped.

Before exchanging "best practice" or developing comprehensive action plans, there is a need to develop a much more fundamental approach to the allocation of research and health-care funding, particularly looking at how the research on health issues pertinent to developing countries can be addressed at the national or regional levels. Stronger policies on international cooperation between developing and developed countries are needed before there can be a more equitable distribution of researchers in developing countries. ■

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