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

الملخص: عادة ما يتطلب بناء خبرات العاملين في مجال البحوث الصحية في البلدان النامية حصولهم على التدريب خارج بلدانهم. ويتمثَّل أحد الأهداف الرئيسية للوكالات المموِّلة للبحوث، التي ترعى مثل هذا النمط من التدريب، في ضمان عودة المتدرِّبين إلى بلدانهم لدى انتهاء التدريب. غير أن تحقيق هذا الهدف يستلزم تطبيق استراتيجيات استباقية. وقد تم وضع الاستراتيجيات التي تتناولها هذه الدراسة وفقا للبرنامج الدولي للتدريب والبحوث خارج الجامعات في مجال مكافحة مرض الإيدز، الذي يموِّله مركز فوغارتي الدولي في المعاهد الوطنية للصحة في الولايات المتحدة. ويقدِّم هذا البرنامج الدعم للجامعات الأمريكية التي تقدِّم برامج تدريبية على إجراء البحوث للعلماء من البلدان النامية، لتمكينهم من التصدِّي للوباء العالمي لمرض الإيدز والعدوى بفيروسه ووباء السل المرتبط بالإيدز. وتصف هذه الورقة الاستراتيجيات المتَّبعة 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 المتدرِّبون في هذه البرامج الطويلة الأمد من ١١ شهراً إلى ٩٦ شهراً من الدراسة (بمتوسط ٢٦ شهراً). وأدت الاستراتيجيات العلمية والسياسية والاقتصادية للتصدِّي لقضية هجرة العقول إلى وصول المعدل المتوسط لعودة الباحثين الرئيسيين المتدرِّبين في هذه البرامج إلى بلدانهم، إلى ٨٠٪.

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Round Table Discussion

Effectiveness of strategies for discouraging brain drain

Anna Whelan[1]

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*). ■

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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 ones 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. ■

Conflicts of interest: none declared.

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

Tim Martineau[1]

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. ■

Conflicts of interest: none declared.

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Brain drain: rethinking allocation

Jane Lethbridge[1]

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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