

Correspondence

Estimating the Number of Antiretroviral Treatment Facilities Based on the Wilson–Blower Method

Ntambwe Malangu

The implementation of the comprehensive plan for the care, management, and treatment of HIV and AIDS in South Africa [1] needs to be supported by all. It is encouraging to note that Wilson and Blower [2] used South Africa to develop a novel method to determine the optimal strategy for allocating antiretroviral treatment (ART) sites among health-care facilities (HCFs) in KwaZulu–Natal.

An equitable allocation of HCFs is necessary to ensure that each individual with HIV will have an equal chance of receiving antiretroviral drugs (ARVs). We have applied their method to determine the number of ART HCFs per district in KwaZulu–Natal.

We first set out to assemble basic details about the KwaZulu–Natal health districts, namely, population and number of hospitals and fixed and mobile clinics. Secondly, by using population data as reported in the KwaZulu–Natal Department of Health 2004 annual report [3], and based on a 10% HIV prevalence, we determined the HIV population per district and also as a percentage of the total HIV population in the province. Finally, we calculated the number of ART HCFs, based on the premise that 54 ART HCFs will serve 100% of the HIV population in the province. By contrasting the estimated number of ART HCFs with the current ART HCFs, we calculated the number of ART HCFs that still need to be established.

The national target for access to HCFs is 10,000 habitants per one fixed primary health-care (PHC) facility [2]. A PHC facility could be a clinic, a community health center, or a hospital. At present, there is one fixed PHC facility for 17,215 inhabitants in KwaZulu–Natal [3].

With regard to ART, the 54 HCFs proposed by Wilson and Blower translate to 18,076 people with HIV per facility (Table 1). This number is close to the actual figure of 17,215 inhabitants per facility in the province.

In terms of equity, it could be argued, for instance, that the two facilities in the eThekweni district cannot be expected to provide ARVs to the estimated 319,994 individuals with HIV. In comparison, the Umziyathi, Amajuba, Umkhanyakude, Uthungulu, and Ugu districts currently have the same number of ART HCFs as eThekweni, but serve smaller populations (Table 1). This reflects the fact that the choice of the current facilities was guided more by practical considerations, such as availability of staff and infrastructure, than by the principle of equity as suggested by the World Health Organization [4].

From our calculations, it seems that in order to achieve treatment equity for individuals with HIV in KwaZulu–Natal, more ARV HCFs should be established as follows: 15 in eThekweni, four each in Umgungundlovu and Zululand, three each in Uthukela and Uthungulu, two each in Ugu and iLembe, and one each in Amajuba, Sisonke, Umziyathi, and Umkhanyakude.

As a recommendation, future rollout of ART should take into consideration the principle of equity. This will ensure that all people with HIV have equal access to ARVs from their nearest HCF. We show that by applying the Wilson–Blower method, it is possible to determine the number of health-care facilities where ARVs would be equitably provided. ■

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Table 1. Number of ART HCF Calculated for Each District

| District | Population | HIV Population (Assuming 10% HIV Prevalence) | Percent of National HIV Population in District | Calculated Number of ARV HCFs Needed | Number of Current ARV HCFs | Number of Further ART HCFs Needed |
|---------------------|------------|--|--|--------------------------------------|----------------------------|-----------------------------------|
| DC-21-Ugu | 729,052 | 72,905 | 7.5% | 4 | 2 | 2 |
| DC-22-Umgungundlovu | 960,819 | 96,082 | 9.8% | 5 | 1 | 4 |
| DC-23-Uthukela | 680,333 | 68,033 | 7% | 4 | 1 | 3 |
| DC-24-Umziyathi | 472,682 | 47,268 | 4.8% | 3 | 2 | 1 |
| DC-25-Amajuba | 484,673 | 48,467 | 5% | 3 | 2 | 1 |
| DC-26-Zululand | 833,037 | 83,304 | 8.5% | 5 | 1 | 4 |
| DC-27-Umkhanyakude | 593,718 | 59,372 | 6.1% | 3 | 2 | 1 |
| DC-28-Uthungulu | 917,451 | 91,745 | 9.4% | 5 | 2 | 3 |
| DC-29-iLembe | 580,307 | 58,031 | 5.9% | 3 | 1 | 2 |
| DC-43-Sisonke | 308,999 | 30,900 | 3.2% | 2 | 1 | 1 |
| Durban-eThekweni | 3,199,944 | 319,994 | 32.8% | 17 | 2 | 15 |
| Total | 9,761,015 | 976,102 | 100% | 54 | 17 | 37 |

Source: Kwazulu–Natal Department of Health [2].

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Evidence-Based Medicine in Iberoamerica: Problems and Possible Solutions

Zulma Ortiz, Pablo Perel, Jordi Pardo

We want to congratulate Chinnock and colleagues, who summarize very well the main problems that evidence-based medicine faces in developing countries [1]. As members of the Iberoamerican Cochrane Network, we would like to share some lessons learned and highlight possible solutions to the problems identified by Chinnock et al. [1].

We have learned from the experience of working in and with Latin American countries that one of the first barriers to overcome is inequity in accessing evidence. The second barrier is the English language. Efforts have been made by our network to overcome both barriers by providing free access to Biblioteca Cochrane Plus (BCP) (<http://www.biblioteca-cochrane.net>). In addition to systematic reviews and protocols, this database contains evidence-based information not indexed in other sources.

However, ensuring access does not necessarily mean that reviews will be used in decision making. Many local problems do not appear in the BCP material, but those that are most prevalent and those with high impact on public health and clinical practice of these countries have been reviewed. Nevertheless, few health professionals apply the results of such reviews. One possible solution is that Cochrane centers, groups, or fields, most of which are based in developed countries, could invest resources in mass dissemination and promote their activities through organizations such as the Pan American Health Organization. This would encourage not only the use of systematic reviews, but also promote an interest in the Cochrane Collaboration from health authorities in the Americas.

Another aspect revealed in Chinnock et al.'s article is the need to get more people from developing countries involved in writing and peer-reviewing systematic reviews. The nature of the Cochrane Collaboration facilitates this, and we have had excellent results when working with several of its groups and fields. However, developing countries have a limited number of people qualified to participate in the writing and peer-reviewing of systematic reviews. Most of those who have the necessary skills also have an enormous load of teaching and clinical care, their salaries are insufficient to support a white-collar lifestyle, and, thus, private practice is the most common means of augmenting earnings. These economic issues are by far the major factor underlying the relative lack of research in developing countries [2]. Cochrane groups and centers based in developed countries should identify potential reviewers in developing countries and invest resources that provide them with spare time to devote to the

promotion, production, and evaluation of systematic reviews. This idea is in line with the Millennium Development Goals [3], specifically number eight, which addresses the need to develop a global partnership for development. Nevertheless, the concerns exposed by Chinnock and colleagues in connection with the search for reviews performed in developing countries would decrease if the use of databases specific to these regions, such as LILACS (Literatura Latinoamericana en Ciencias de la Salud) in Latin America, was encouraged and if the use and development of these databases were supported.

Finally, we consider that advocacy on the importance of research and evidence-based public health should be strengthened in developing countries. This has been highlighted by Bernardo Houssay, the first Latin American honored with the Nobel Prize, who said, "Science is only science when it involves constant progress and improvement arising from research. Thus, there are only two possible standpoints: that of tuggers and that of others being tugged. In other words, you may either create knowledge at the same time others do, or accept a subordinate position and depend on what others produce." When the response to his views was different from what he expected, he added, "It would not be ethical to base a research strategy on the unfair exploitation of sacrifices made by those with exceptional and determined minds. Wise countries do not live waiting for saints or miracles to occur" (quoted in [4]). ■

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PLoS Takes a Step Backward

John J. Pippin

The only people who don't know in 2005 that animal research is irrelevant for human disease are those who don't understand it or those who benefit from it. As a physician, clinical researcher, and former animal researcher, I know that though they are our closest genetic relatives,

primates have failed as research models virtually whenever they have been used.

As a partial list of failures, allow me to submit the notorious forced smoking experiments, which allowed cigarettes to be promoted widely for decades; the abject failure of a quarter-century of primate research on AIDS to provide any useful insights; the false leads and dangerous vaccines produced during polio research (verified by Albert Sabin, himself); the failure of primate studies to improve risks for birth defects and premature births; and the failure of monkey studies to identify nonsteroidal anti-inflammatory drug cardiovascular risk [1].

The *PLoS Medicine* editors state in hopeful language that the Lassa fever vaccine was successful in four monkeys, and, thus, is a suitable agent for human study [2]. Recall that VaxGen's AIDS vaccine (AIDSVAX) showed great success in primate studies, but was an abject failure in two human clinical trials, including a trial of over 2,500 injection drug users in Thailand [3] and a multinational trial of over 5,000 high-risk individuals [4].

Consider the fruitless decades-long effort to produce an AIDS vaccine in primates, the failure to produce even a single case of human AIDS in any primate studied, or the failure to identify even one useful AIDS drug from primate studies. Genetic and physiological imperatives dictate that no animal model, even higher primates, gives information applicable to humans. The Human Genome Project [5] tells us that there is sufficient genetic diversity among humans that pharmacogenetic and pharmacogenomic techniques will have an increasing role in overcoming problems related to polymorphisms and other variations. We can't even apply scientific findings uniformly to humans, and *PLoS Medicine* is now promoting monkey research?

I am very disappointed that *PLoS Medicine* has regressed to reporting animal research. It is discouraging that in this era of rapid biomedical advancement, and appropriate relegation of animal research to the historical dustbin, PLoS has chosen to re-introduce an anachronistic, medically discredited, and unethical research tool to its reporting. ■

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Nanotechnology for the Poor?

Guillermo Foladori, Noela Invernizzi

After interviewing 63 experts, Salamanca-Buentello et al. [1] identified the ten main nanotechnologies that could provide a solution to problems involving water, agriculture, and health. Overflowing with good intentions, the proposal reflects the idea that if a problem can be identified, all that has to be done is apply a suitable technology and it will be solved. Most of the examples do not take into account that the relationship between science and society is much more complex.

The authors suggest that quantum dots could detect HIV molecules in the early stages, facilitating the treatment and reducing the number of new cases. The authors seem to forget the story of recent years, which has been one of open war between multinational pharmaceutical corporations and countries seeking to manufacture antiretrovirals. Nanotechnology products are already being patented. A patent in the US costs US\$30 000 in legal bureaucracy, and a worldwide patent may be as much as US\$250 000 [2]. The moral of the story: the efficiency and implications of the application of technology depend on the social context.

The article identifies nanotechnology as the solution to five of the eight UN Millennium Development Goals [3]. Among these solutions are nanosensors to improve the dosage of water and fertilization of plants, and hopefully reduce poverty and hunger. Not so long ago, genetically modified organisms were hailed as the solution that would put an end to hunger. However, they ended up being used mainly in developed countries. There has been no improvement for developing countries; quite the contrary, transgenics turned up where they were not wanted, as was the case in Oaxaca [4]. The moral of the story: the choice of technology is not a neutral process. It is not necessarily true that the technology that is best and meets our needs will be the one to survive.

In a previous article [5] three of the same authors maintained that the position adopted by Prince Charles—arguing that nanotechnology will widen the gap between rich and poor countries—and the position of the Action Group on Erosion, Technology and Concentration—requesting a moratorium on manufacture and commercialization of synthetic nanoparticles—both ignore the voices of people in developing countries. With their research the authors intended to fill this gap. But the opinion of scientists involved in nanotechnology does not necessarily fall in with the most appropriate pathways for satisfying the needs of the poor. We may concur that infectious diseases are one of the main problems that the developing world is facing, but we may differ radically on how a solution to this problem should be attained. Prevention is not the same thing as cure. Nanotechnology is not necessary to reduce malaria radically, as is suggested by the authors. In Henan Province, China, malaria was reduced by 99% between 1965 and 1990 as a result of social mobilization, backed up by fumigation, the use of mosquito nets, and traditional medicine based on artemisinin [6]. Viet Nam reduced the number of malaria-related deaths by 97% between 1992 and 1997 with similar methods [7]. The moral of the story: there are many means to an end, and technology is not always the solution. Organizing people can be just as important. ■

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Why We Whistleblowers Are Passionate in Our Convictions

Stefan P. Kruszewski

Whistleblowers serve no function if they cannot tell their stories. The present story of whistleblowing—as discussed, in part, in *PLoS Medicine*—that involves the pharmaceutical industry, pharmaceutical benefit management corporations, the managed care industry, and the political and lobbying forces that zealously guard their secrets could not have been told without the help of courageous men and women [1, 2] For that reason, those of us who congregated in Washington, D.C., on May 15th, 2005, at the invitation and support of the Public Library of Science and the Government Accountability Project feel particularly humbled and grateful to these two sponsors. Our convictions could not have been aired were it not for the essential First Amendment work of responsible journalists, who exemplify the best in investigatory research.

For me, whistleblowing is not a theoretical exercise. It has a human face and tangible features. It is the face of children and adults who have been injured or killed by misrepresented pharmaceuticals; clinical research trial results that have been sequestered from the scientific community and whose incomplete findings cause injury; and pharmaceuticals that are detailed to physicians, not to save lives or necessarily improve the health or welfare of the recipients, but to make money.

In the lonely and, at times, discouraging world of whistleblowing, we whistleblowers are passionate, and often

successful, because our efforts have a different goal than the corporations and political interests whose operations we occasionally challenge. Our goal is to tell the truth. That honest effort is the source of any ethical difference we can or might make. Truth is the basis for the power of a whistleblower, one that can withstand the assault of unprecedented odds against being heard put forth by that sum of political power, expediency, and money.

A whistleblower's success depends upon competent and articulate media. The debate to improve the status quo—be it in pharmaceutical marketing or managed-care decision making—cannot proceed or flourish without it.

Ralph Waldo Emerson, American essayist and philosopher (1803–1882), commented about success (I have adapted his comments for all of us who gathered in Washington in mid-May 2005): “To leave the world a bit better, whether by a healthy child, a garden patch or a redeemed social condition; to know even one life breathed easier because you have lived; this is to have succeeded [as a whistleblower].” ■

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Future Scenarios for Academic Medicine Should Include Other Health Disciplines

Patrick McGrath

With reference to Awasthi and colleagues' Policy Forum [1], International Campaign to Revitalize Academic Medicine (ICRAM) has done an excellent service by provoking thought about the future of academic medicine by outlining five scenarios. However, all of the scenarios are seriously deficient because they do not sufficiently incorporate in their vision other health disciplines and professions. Increasingly, translational research and knowledge transfer depend on interdisciplinary teams. Good patient care requires team approaches. Academic medicine is realizing the value of collaboration and is opening itself to disciplines such as nursing, psychology, occupational therapy, and physiotherapy. In addition, disciplines such as health informatics are vital. Envisioning the successful future of academic medicine requires collegial inclusion of other health-related disciplines. ■

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The Need for a New Specialist Professional Research System of “Pure” Medical Science

Bruce G. Charlton, Peter Andras

Awasthi et al.’s discussion of the future of academic medicine [1] is stimulating, but the primary focus of policy should be enhancing scientific progress in medicine. Science policy should address the decline in major, clinically relevant “breakthroughs” over recent decades [2].

Medical research has become mostly an “applied” science, which implicitly aims at steady progress by an accumulation of small improvements, each increment having a high probability of validity. Applied medical science is therefore a social system of communications for generating pre-publication peer-reviewed knowledge ready for implementation [3]. However, the need for predictability dictated by peer reviewing of research funding and the need for a high probability of validity in published research makes modern medical science risk-averse. This has led to a decline in major therapeutic breakthroughs where new treatments for new diseases are required [2].

There is a need for the evolution of a specialized professional research system of pure medical science, where the major evaluation of validity occurs (in the manner of classic sciences) post-publication and by peer usage, rather than peer review [3,4]. The role of pure medical science would be to generate and critically evaluate radically novel and potentially important theories, techniques, therapies, and technologies.

Pure science ideas typically have a lower probability of being valid, but have the possibility of much greater benefit if they turn out to be true [5]. The domination of medical research by “applied” criteria means that even good ideas from pure medical science are typically ignored or rejected

as being too speculative. It is possible to publish radical and potentially important ideas in medical science, but at present there is no formal mechanism by which pure science publications may be received, critiqued, evaluated, and extended to become suitable for “application”.

Pure medical science needs to evolve to constitute a typical specialized scientific system of formal communications among a professional community with close research groupings, journals, meetings, and electronic and Web communications—like any other science. However, the pure medical science system would have its own separate aims, procedures for scientific evaluation, institutional organization, funding, and support arrangements, and it would have a separate higher professional career path with distinctive selection criteria. For instance, successful leaders of pure medical science institutions would need different qualities from many of the current leaders of medical science, and would need to be selected on the basis of their specialized cognitive aptitudes and their record of having generated science-transforming ideas.

The main “market” for pure medical science would be “applied” medical scientists who need radical strategies to solve important clinical problems that are not yielding to established methods. Pure medical science units might then arise as an elite grouping linked to existing world-class applied medical research institutions. The direct financial stimulus to create elite pure medical science institutions might come from the leadership of academic “entrepreneurs” and imaginative patrons in the major funding foundations. ■

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