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Abstract

Background: How should HIV and AIDS resources be allocated to achieve the greatest possible impact? This paper begins with a theoretical discussion of this issue, describing the key elements of an "evidence-based allocation strategy". While it is noted that the quality of epidemiological and economic data remains inadequate to define such an optimal strategy, there do exist tools and research which can lead countries in a way that they can make allocation decisions. Furthermore, there are clear indications that most countries are not allocating their HIV and AIDS resources in a way which is likely to achieve the greatest possible impact. For example, it is noted that neighboring countries, even when they have a similar prevalence of HIV, nonetheless often allocate their resources in radically different ways.

These differing allocation patterns appear to be attributable to a number of different issues, including a lack of data, contradictory results in existing data, a need for overemphasizing a multisectoral response, a lack of political will, a general inefficiency in the use of resources when they do get allocated, poor planning and a lack of control over the way resources get allocated.

Methods: There are a number of tools currently av

a clearer idea of resource requirements, whereas other tools such as Goals and the Allocation by Cost-Effectiveness (ABCE) models can provide countries with a clearer vision of how they might reallocate funds.

Results: Examples from nine different countries provide information about how policymakers are trying to make their resource-allocation strategies more "evidence based". By identifying the challenges and successes of these nine countries in making more informed allocation decisions, it is hoped that future resource-allocation decisions for all countries can be improved.

Conclusion: We discuss the future of resource allocation, noting the types of additional data which will be required and the improvements in existing tools which could be made.

Background

In 2001, demographers, epidemiologists and economists, under the direction of the World Health Organization and UNAIDS, were asked to estimate the resources required to achieve the newly developed UNGASS targets [1]. The $9.2 billion projection represented an optimistic estimate of the level of resources which could be generated by

2005, considering that the global level of resources for HIV and AIDS were only $1.6 billion in 2001.

One of the great successes in raising funds for the response to the HIV and AIDS pandemic has been the rapid increase in resources for the global response, as shown in Figure 1. From the UN General Assembly Special Session on HIV and AIDS in 2001 to the most recent estimates of global spending in 2007, the level of funding has grown more than 6 fold to $10 billion [2]. The actual level of spending in 2005 reached $8.3 billion [2], or 90% of the resources determined to be required in the original 2001 resource needs estimates. Estimates of global resource needs have been reassessed on a regular basis. The most recent assessment projects needs in 2015 of US$22-54 billion, under three different assumptions about the pace of scale-up [2].

While no single factor can explain why the growth in spending has occurred so rapidly, it can be partially

The original resource requirement estimates were based on an assumption that 6 billion condoms would be dis-

national epidemics, choose not to implement evidence-based programming, or ignore the needs of marginalized groups affected by HIV" [8].

Alternatively, Country B has pursued an "evidence-based allocation strategy", carefully assessing its epidemic, the cost-effectiveness of its interventions, synergies between interventions, the policy environment, etc. Using this evidence, Country B has established clear and logical priorities and has allocated its resources accordingly. In this case, donors may choose to assign more funds to Country B, because that country is more likely to have an impact on its epidemic.

Unfortunately at this time, calculating this optimal allocation pattern is not entirely feasible, in part because there is no known optimal allocation of HIV and AIDS resources [9]. With the availability of better prospective information on spending patterns and HIV prevalence091w9.720037d06 T2ewng thi optivalence091w9.7(no)-6.1999998( )fe ps al

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similar prevalence of HIV, such as Kazakhstan and Kyrgyzstan, spend their HIV and AIDS resources in radically different ways. Kazakhstan spends most of its resources on program support, whereas Kyrgyzstan spends most of its resources on prevention.

The analysis becomes even more revealing when specifically evaluating the allocation of resources on prevention programs. In Figure 4, sub-Saharan countries are again arranged from the lowest-prevalence countries on the left to the highest prevalence countries on the right. In this case, the allocation of prevention resources appears to occur in a random pattern. Again looking at the two highest prevalence countries, Botswana and Swaziland, the approach to allocating prevention resources appears to be markedly different. In the case of Botswana, most prevention resources are spent on PMTCT, whereas Swaziland appears to spend a small proportion of its resources on this intervention. On the other hand, Swaziland appears to spend most of its resources on BCC and VCT, two interventions which are allocated a much smaller proportion of all resources in Botswana.

There are also numerous examples cited of misallocations of funds in Asia, as reported in Elizabeth Pisani's book "The Wisdom of Whores" [12]. For example, in China, 90% of HIV transmission is attributable to MSM or IDU, yet 54% of all donor prevention money is allocated to the "general population".

National policymakers are not the only stakeholders who appear to misallocate funds. In Accra, Ghana, for example, it has been estimated that 76% of all new HIV infections occur between sex workers and their partners, while the remaining 24% of all new infections occur within the general population [13]. However, the World Bank MAP program in Ghana estimates that it spends only 0.8% of its resources on sex worker interventions and spends 99.2% of HIV and AIDS resources on the general population [14]. These data suggest that donors, at least in the case7u087 392.9s(ile)]TJETd spendcas0 gB6 313.079650887.21uuoctio

Spending patterns appear to be only nominally related to the severity of the epidemic in sub-Saharan Africa, and are totally unrelated to prevalence in the rest of the world. Prevention resources appear to be allocated randomly, with no evidence showing that countries allocate their spending based on evidence about the source of new HIV infections.

Why don't countries allocate resources based on evidence?

If countries are not pursuing an "evidence based allocation strategy", the next question is to ask why. A number of possible explanations are listed below.

Lack of da a

One possible explanation for poor resource allocation is that countries don't have access to the information required to make rational decisions regarding the allocation of HIV and AIDS funds. This is a very plausible explanation, given that most countries don't have access to data about the cost-effectiveness of different interventions. While there are data which suggest that some interventions may be more cost-effective than others [15-17],

and AIDS messages from varying sources (e.g., mass media, peer education, etc.) [30]. An approach which suggests that a country should spend all of its resources on one intervention (e.g., condoms) is unlikely to produce the same benefits as a holistic program which focuses on a wide variety of interventions. Thus, STI treatment, condom distribution, ART, and stigma and discrimination interventions (among other interventions) are likely to have synergistic benefits which could not be achieved if a country merely spent all of its resources on a single, prioritized intervention.

This argument, however, must be balanced against the temptation to scattere ben

example, as a primary target population in Latin America, there is a possible risk that MSM would become further stigmatized and blamed for spreading the epidemic. However, a country's national strategic goals are unlikely to be

Zambia unsuccessfully requested US$1 billion over 5 years from the Global Fund. As it turned out, the 26 countries which did receive immediate approval for their Global Fund applications had requested a cumulative total of $977 million over 5 years. In other words, Zambia had requested funds greater than the combined amount requested by the 26 countries with successful applications. While Zambia is a country that is severely affected by HIV and AIDS, their "wish list" approach to costing its Global Fund proposal concluded with a failure of the

quantifiable factors such as equity [38]. This model has been applied in a South African health clinic, with the result that the authors recommended an increased effort to promote condoms at this site.

Experience with one resource-allocation tool

The Goals model has been used to improve the resource-allocation process in seventeen countries since 2002, including eight of the fifteen PEPFAR countries. Of the seventeen countries where the Goals model has been used, twelve are in Africa, theventeen10026 (evente54(,)6.09999939999te54(,)6.099wo39999te 9.72000026 5579.72000999938 2

the Goals model confirmed that the general provision of ART would be affordable for the government.

There were numerous positive outcomes based on these observations. For example, the government prioritized and allocated additional funds for sex-worker interventions, condom distribution, PMTCT programs and general ARV access. However, while the government agreed to research the needs of MSM and IDU in South Africa, they did not agree to additional funding to reach these populations. In other words, despite some evidence to the contrary, South Africa remained unwilling to address existing

2005, Zambian policymakers could point to a number of important successes, including reductions in HIV preva-

but less than a third of the resources required for full coverage. The result would be to decrease prevalence (from

cating funding to treatment averted the most deaths and achieved high ART coverage but did not prevent as many new infections.

This information was presented in meetings with the UAC, civil society, donors, government departments, and

words, it is critical to assess not only where HIV infections have occurred (in terms of vulnerable subpopulations, regional variations, etc.), but also to understand where the next infections are likely to occur. Countries need to move beyond the oversimplified conclusion that "everyone is at risk", and instead truly understand whether certain subpopulations are at greater risk than others. UNAIDS has been supporting a series of regional activities known as "Know Your Epidemic, Know Your Response" in which country teams assemble information on the status of the epidemic and their national program. The Modes of Transmission model is applied to estimate the sources of new infection. The results from this modeling are compared to the current allocation of efforts to determine how the response might be improved.

Next, countries need to have a clear grasp on the costs of different interventions. In the earlier years of the epidemic, it may have been acceptable that countries lacked information about a reasonable range of unit costs for a set of prevention and treatment interventions. However, at this stage of the epidemic, it is totally unacceptable that countries cannot provide even a reasonable range of unit costs for particular interventions. Where unit cost data are not available, it should be a high priority to collect such information. Most organizations implementing interventions know their own costs, since they need to prepare budgets to request support from funding agencies. This information needs to be compiled systematically and used to estimate resource requirements. This is important not only for the purpose of allocating resources, but also for identifying potential inefficiencies in scaled-up programs.

A key way to improve their resource-allocation process is to integrate resource allocation into each country's entire planning process. Most countries assess their resource needs as a final step in the planning process, rather than throughout the overall planning process. This is not to suggest that the planning process should be limited by some arbitrary financial limits. However, countries should be encouraged to consider throughout the planning process a set of different scenarios based on assumptions about what level of resources may be realistically available.

Finally, countries should design their own plan for financial sustainability. This is important because most countries today plan no further than their next budget cycle, paying very little attention to how the priorities of donors and governments might shift in the future. This is particularly critical for countries which rely heavily on a small number of donors (e.g., PEPFAR; Global Fund, etc.). All plans should include contingencies to cover worst-case scenarios, which is particularly important given the current global financial crisis. What happens if PEPFAR funding is reduced or "flat-lined"? What happens if a country doesn't win any further Global Fund applications? What if the priorities of a country shift away from HIV and AIDS?

Incorporating new information into resource-allocation models

The future of evidence-based planning will ultimately require that existing tools that are used to address issues of resource allocation are greatly improved and that new tools are developed. A critical first step in improving resource-allocation tools involves improving knowledge about the costs and cost-effectiveness of interventions. Existing tools rely on an incomplete database of cost and cost-effectiveness studies. Little is known, for example, about the cost-effectiveness of community outreach interventions or interventions designed to reach MSM. A concerted global effort should be made to expand the current literature on the cost and cost-effectiveness of HIV and AIDS interventions, with an emphasis on providing data that can specifically be used by policymakers as they allocate resources.

It is also imperative that resource98(an incom)-6(plete datab)-6.09 t

tized groups (e.g., MSM) is only likely to occur if resources are also spent on convincing political leaders about the importance of reaching these subpopulations. Each of these types of synergies needs to be considered in the design of future resource-allocation tools.

There also remain areas where significant additional research needs to be conducted. For example, little is known about the resource-allocation strategies of countries which have been able to successfully address the HIV and AIDS epidemic. Up until recently, the lack of such research was understandable, given the paucity of data about the way resources are spent and the very limited information about the historical prevalence trends in various countries. However, at this point in time, there is an increasing level of data about both spending and prevalence trends. This information should be rigorously analyzed so that countries are better able to make resource-allocation decisions.

Conclusion

This paper was designed to challenge national policymakers to consider how resource allocation is being conducted, and to reevaluate how it might be pursued better in the future. As seen from numerous countries, there are few outstanding examples of countries which have carefully assessed their resources allocation strategy and acted in a way which could be considered "evidence-based". Furthermore, few countries have incorporated into their own strategic planning process an assessment of financial sustainability. Given the current global financial crisis, countries cannot afford to ignore the issues of accountability and sustainability [8].

How can these problems be addressed? A review of current efforts to understand and improve the resource-allocation process indicates both successes and failures. Countries have seen resource-allocation modeling as merely another tool imposed upon them by international donors, rather than an essential process that should be integrated into the country's planning process. Few if any countries have taken the opportunity to conduct resource-allocation modeling so that they can actually shift resources from low priority interventions to those which are a higher priority.

However, countries such as Lesotho, Kenya and Honduras have used resource-allocation modeling as a way to demonstrate to donors the potential benefits of investing in the country's HIV and AIDS response. Countries such as South Africa and Ukraine have used resource-allocation modeling as a way to increase domestic commitment and to generate new resources. Namibia has used resource-allocation modeling to confirm that their NSP was severely undercosted. Uganda used modeling to provide the information for a vigorous debate among stakeholders about priorities for allocating scarce resources.

For the national resource-allocation process to be improved over the long term, both countries and the global community must move forward. Research must be performed on costing and cost-effectiveness. Much more is needed in terms of understanding how resource allocation has helped countries to develop an effective response, while also understanding how poor resource-allocation decisions have limited the impact of available resources.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

SF was responsible for the overall writing of this paper with review and additional input provided by Lori Bollinger and JS. The description of the resource allocation models was written largely by LB and JS. The country-specific Goals applications were conducted by a combination of the three authors.

List of abbreviations used

ABCE: (Allocating by Cost-Effectiveness Model); AIDS: (Acquired Immune Deficiency Syndrome); ANC: (Antenatal Clinic Survey); BCC: (Behavior Change Communication); DHS: (Demographic and Health Survey); ART: (Antiretroviral Therapy); HIV: (Human Immunodeficiency Virus); IDU: (Injecting Drug Users); PMTCT: (Prevention of Mother to Child Transmission); MAP: (Multi-Country HIV/AIDS Program); MARPs (Most At-Risk Populations); MSM: (Men Who Have Sex with Men); NASA: (National AIDS Spending Assessment); NMSF: (Tanzanian National Multi-Sectoral Framework); NSP: (National Strategic Plan); OVC: (Orphans and Vulnerable Children); PEPFAR: (President's Emergency Plan for AIDS Reliefcial crisis,

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