

HIV Prevention 5



Making HIV prevention programmes work

Stefano M Bertozzi, Marie Laga, Sergio Bautista-Arredondo, Alex Coutinho

Even after 25 years of experience, HIV prevention programming remains largely deficient. We identify four areas that managers of national HIV prevention programmes should reassess and hence refocus their efforts—improvement of targeting, selection, and delivery of prevention interventions, and optimisation of funding. Although each area is not wholly independent from one another, and because each country and epidemic context will require a different balance of time and funding allocation in each area, we present the current state of each dimension in the global HIV prevention arena and propose practical ways to remedy present deficiencies. Insufficient data for intervention effectiveness and country-specific epidemiology has meant that programme managers have operated, and continue to operate, in a fog of uncertainty. Although priority must be given to the improvement of prevention methods and the capacity for the generation and use of evidence to improve programme planning and implementation, uncertainty will remain. In the meantime, however, we argue that prevention programming can be made much more effective by use of information that is readily available.

Introduction

The preceding papers in this Series have reviewed the state-of-the-art of knowledge in biomedical,¹ behavioural,² and structural approaches³ to HIV prevention. Here, we ask how this information can be used and what additional information is needed to optimise national HIV prevention programmes. Optimisation of a national response to prevent the transmission of HIV requires not only information, but also knowledge of how to use the data to improve the response. Focusing on developing countries, we imagine how managers of national HIV prevention programmes could reassess and prioritise available resources to improve the performance of national prevention efforts. We identify four key areas on which time and attention should be focused: improvement of targeting, selection, and delivery of prevention efforts, and optimisation of funding.

In no country will the benefits of a programme manager allocating additional time to any one of the areas identified be the same. Typically, the greatest benefit of additional time invested will result from improving the dimension that is currently furthest from optimum. However, the costs and feasibility of improving performance in that dimension will also affect the decision. For example, in a country where the current level of funding represents

only a small fraction of the budget needed, focus should be given primarily to securing additional funds. Similarly, in a country with adequate funding but gross inefficiency in the delivery of services, focus should be placed on improving management and monitoring.

Making decisions in the real world

One of our challenges is confronting the chasm that exists between the academic world, in which optimisation is

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Key messages

- Four key areas must be addressed to maximise the effect of national HIV prevention programmes—the targeting, selection, and delivery of prevention interventions must be improved, and funding optimised
- Available data suggest that most national prevention programmes are operating well below their potential in all four areas. Prevention planning efforts have been myopic, as if the HIV epidemic were a short-lived emergency
- Although the four key areas are inter-related, each can be addressed independently to improve the impact of a national prevention programme, even with currently available information. Improving performance in any one area will increase the effectiveness of a national prevention programme, and is all the more urgent if that area is performing poorly and if performance can be dramatically improved at little cost
- Because of the scarcity of high-quality data for the epidemiology of HIV and its associated behaviours and determinants at the country level, and for the cost and effectiveness of the different combinations of interventions available, efforts to increase the effect of prevention programmes have been handicapped
- Data to improve performance in all four areas must be collected at different levels: evidence of intervention effectiveness can be gathered at the global level, since one country can learn much from successes and failures in another; by contrast, epidemiological data, knowledge of the epidemic in a particular setting, and data for scale and coverage of the prevention response are only useful when generated locally. Data for managerial performance and unit costs must be collected at the level of individual programmes and facilities
- Although we must strive to reduce uncertainty by generating better and more useful data, we must also improve current decision making by making better use of existing data

Search strategy and selection criteria

Information for this paper was obtained from various sources, which included initial searches of databases including Medline, PubMed, and Econlit. However, the emerging nature of this subject does not lend itself to systematic literature review methods. Works relating to the content of this article were therefore identified from the authors' own experience, through consultation with others involved in such work, and by manually searching reference lists of well-respected publications on the topic.

Panel 1: The Asian epidemic model in Thailand—what lessons can be learned?

HIV incidence has declined substantially in Thailand from an estimated 150 000 new infections per year in 1992 to 13 000 in 2007, illustrating the success and the effectiveness of large-scale prevention efforts, most notably the 100% condom use campaign in the early 1990s.

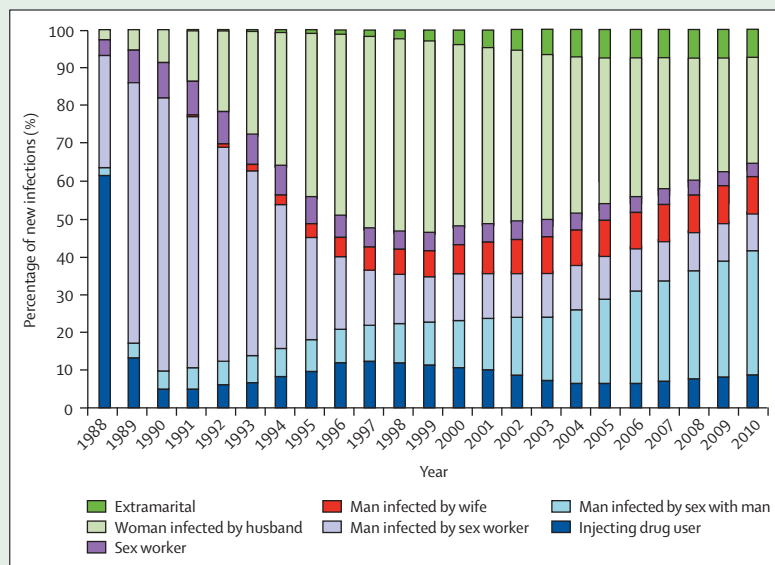


Figure 1: HIV infections by mode of transmission in Thailand¹⁰

The roles of different groups of individuals in the transmission of HIV in Thailand have changed over time (figure 1). Sex workers and their clients were initially the major transmission category. However, men who have sex with men have become proportionally more important in the spread of new infections in Thailand, requiring new prevention approaches. Transmission among injecting drug users remains common, thus increasing access to harm reduction activities is recommended. The epidemic remains largely concentrated, but general population strategies such as addressing discordant couples and prevention of mother-to-child transmission should be emphasised.

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normally based on controlled trials that report results with 95% certainty, and the real world, where uncertainty reigns. In the ideal, evidence-based world, a programme manager operates with perfect information, which includes at least the following: a known, fixed budget; detailed, historical data for levels and distribution of HIV incidence and risk behaviours; cost-effectiveness estimates for the full set of feasible interventions, at all potential scales, targeted to different populations; and experience of implementation in different combinations. All relevant positive and negative synergies between these different combinations in specific contexts would thus be taken into account. In such an ideal world the manager would scale-up the most cost-effective mix of interventions until their marginal cost-effectiveness drops to the point at which the next best package is now more cost effective, and then scaling up these interventions until the next set becomes more cost effective, and so on.

By contrast, in the real world, available information does not come anywhere close to providing such a clear image for the optimum course of action. Rather, HIV/AIDS programme managers find themselves operating in a fog of uncertainty because of the scarcity of available information and the limited capacity to apply what information is available. The global community has unwittingly contributed to perpetuating, if not exacerbating, this uncertainty. By pretending that programme managers have sufficient evidence available to design fully evidence-based national strategic plans for HIV prevention, we have implicitly redefined evidence as anything that any self-proclaimed HIV/AIDS expert believes is likely to be effective. Second, because the response to the epidemic for 25 years has been myopic, short-term, using an emergency approach to the epidemic, both nationally and globally, we have not invested appropriately in development of new methods or in generating data about the effectiveness of current methods.

Targeting of prevention interventions

The effectiveness of any prevention programme depends on the extent to which effective interventions reach people at high risk of contracting the virus. HIV is spread in a very heterogeneous way worldwide. Even within countries, the risk of contracting and transmitting HIV varies widely. For instance, the risk of HIV infection varies greatly with age in all countries, but countries are very different with respect to the relative risk of infection in specific subpopulations versus the general population.

Improvement of the prevention response through better targeting requires understanding of the epidemiology of the virus, of human behaviours, and their drivers, as captured by the UNAIDS recommendation: understand your epidemic.⁴ Analyses must capture not only current patterns, but also trends, so that planners can predict where infections are likely to occur in the future.

A crude classification of HIV epidemics, initially designed for guiding surveillance, has been extended to make it more useful for prevention planners.⁵ In a low level epidemic, HIV has not spread to more than 1% in any population (eg, Middle East, Afghanistan). In a concentrated epidemic, HIV prevalence is over 5% in at least one subpopulation (eg, most of Latin America, southeast Asia). In a generalised epidemic, HIV prevalence exceeds 1% in the general population (eg, sub-Saharan Africa, Haiti). Lastly, in a hyperendemic state, HIV prevalence in the general adult population exceeds 15% (eg, only in southern Africa). Although these four categories provide a rough hierarchy of country epidemics and some initial insight into the scale and targeting of prevention, they still conceal vital heterogeneity. In the category of concentrated epidemics, the prevalence of HIV in key populations can vary from 9% (eg, in injecting drug users in

Armenia) to 89% (eg, among injecting drug users in Krivoi, Ukraine).⁶ In some generalised epidemics—eg, Ghana or Andhra Pradesh, India—most new infections are still attributable to one subpopulation (sex workers).⁶ The canton of Geneva, Switzerland, has an adult HIV prevalence of just over 1%, yet this does not reflect a self-sustaining epidemic in the general population.⁷ The categories also fail to capture variable levels of geographic spread, the epidemic phases (early, plateau, declining), or the dynamics of spread to new risk groups. The categories also suggest a false continuum. Although generalised epidemics have always evolved from a concentrated epidemic, not all concentrated epidemics evolve to be generalised; most do not. With the exception of countries in southern and eastern Africa, most countries in the world with well-established concentrated epidemics 10 years ago remain concentrated today.⁸

Because prevalence reflects infections that happened in the past, a more relevant question for prevention planners is “where will the next 1000 infections occur?”⁹ Data about HIV incidence are scarce because direct measurement of incidence through cohort studies is complex and costly. No technology exists that has good validity to distinguish incident infections from prevalent cases. This concern becomes more acute as coverage of antiretroviral treatment rises, both because improved longevity increases prevalence and because current prevalence is a reflection of incidence from even longer ago.

Models have been developed to estimate the number of new infections by transmission category, to help prevention planners focus their efforts. An excellent example is the Asian epidemic model, which models concentrated epidemics in Asia (panel 1).¹¹ UNAIDS estimates of the proportion of HIV infections attributable to the different transmission categories around the world are shown in Merson and colleagues¹² contribution to the series. Models that can describe incidence by transmission category¹³ in generalised epidemics are still in development and will require high quality data (behavioural data, HIV prevalence, prevalence of other sexually transmitted infections, and size estimates of subpopulations) for each country.

The limited data available indicate that many countries are not adequately focusing prevention resources where the epidemic is concentrated. Analyses of recent coverage rates, as reported in country reports to the UN General Assembly Special Session (UNGASS),¹⁴ illustrate the mismatch between the populations at greatest risk of becoming infected or transmitting HIV and efforts made to reach them with prevention programmes. Only 34% of countries with a concentrated or low level epidemic among injecting drug users have implemented specific prevention strategies to reduce their risk.¹⁴ And in countries where the main mode of transmission is in men who have sex with men (eg,

Panel 2: Optimum targeting—sex workers in the Democratic Republic of the Congo

A model example of optimum programme targeting and selecting the appropriate mix of interventions is a study implemented in Kinshasa, Democratic Republic of the Congo, in female sex workers between 1988 and 1991, a time when such individuals in Africa and Asia were reported to have HIV prevalence rates as high as 75% and incidence rates of 38% per year.^{21,22} The programme included a mix of condom promotion, individual health education, and monthly screenings and treatment for sexually transmitted infections for 531 initially HIV-negative female sex workers. Although 70 participants seroconverted during the course of the study, the incidence of HIV infection decreased from 11.7 cases per 100 women-years over the first 6 months to 4.4 per 100 women-years over the last 6-month interval 3 years later. Additionally, throughout the course of the study, regular condom use with clients increased from 11% at baseline to 52% after 6 months and to 68% at 36 months of programming; incidence rates of most sexually transmitted infections also decreased.²³

This study shows how designing a comprehensive package of interventions to reduce risk behaviours for an individually focused, state-of-the-art project in key populations can substantially increase health-seeking behaviours and reduce HIV incidence. However, despite this being one of the first interventions shown to work, almost 20 years later, most African countries, with the exception of Côte d'Ivoire, do not have a national plan to scale up interventions for sex workers. In 40% of countries with a generalised epidemic, no services for sex workers were available in 2007, and worldwide less than 50% of sex workers have access to HIV testing and condoms.¹⁴

Mexico, Turkey, or Greece), less than 25% of men who have sex with men had access to condom-based prevention efforts in 2007.^{15–18} This information is consistent with earlier reports from the coverage surveys implemented by the Futures Group, which revealed a similar mismatch.^{19,20} There are few documented examples of effective targeting to learn from; one is described in panel 2, while panel 3 illustrates the success of scaling up prevention in India today through the targeting of the highest risk groups.

Mismatches between implemented prevention activities and those that are needed at a country level occur for a number of reasons. The most important are a scarcity of information caused by under-implementation of monitoring and surveillance systems; limited national capacity in many countries to design and implement such systems; and limited understanding of how to use existing data for distribution and trends of infection, behaviours, and drivers to prioritise prevention planning. However, another important barrier in most countries is not lack of knowledge about which populations should be targeted, but rather the political, legal, cultural, or social barriers that hinder the implementation of targeted plans. Far too often these barriers are recognised by national programmes just in the abstract—a nebulous ensemble of conservative, traditional, or religious forces in a society that limit their scope of action. Taking effective action requires mapping and understanding the barriers and then planning concrete steps to address them. Despite widespread recognition of the critical importance of such barriers, rare indeed is the national programme with dedicated

staff assigned to mapping, analysing, and developing strategies for addressing the barriers.

What can be done to solve these problems? The most important data to collect is trends in HIV incidence in different populations so that a country's epidemic can be understood, as well as for assessment of the effect of prevention programmes. The development of improved laboratory tests that can distinguish recent HIV infections from those that are longstanding should be seen as a priority.

More guidance should be given to programme managers about data collection priorities for prevention planning, for monitoring the delivery of prevention services, and for assessing the effect of prevention programmes. Epidemiological data should include proxy indicators of incidence, such as prevalence in young age-groups (eg, 15–24 years). In concentrated

epidemics, methods for integrated behavioural-biomedical surveys in groups at higher risk should be strengthened and standardised, including methods for mapping and estimating the size of hard-to-reach populations, to allow assessment of trends over time. In generalised epidemics, population-based surveys that include a behavioural component at regular intervals (4–5 years) are recommended. More powerful and user-friendly models or software should be developed to allow countries to estimate the number of new infections by transmission category on a regular basis.

Surveillance of other sexually transmitted infections is useful in its own right, informing programmes to decrease morbidity and mortality caused by such infections, and can also be useful to HIV prevention planning because sexually transmitted infections are a marker for risk behaviour and important facilitators of transmission. Such surveillance can be focused on groups at higher risk in concentrated epidemics and included in population-based surveys in generalised epidemics.

However, understanding an epidemic is more than just surveillance, even if that surveillance is extended to include behaviours and other sexually transmitted infections. National programmes must also implement regular monitoring of contextual factors, determinants of risk behaviour, and barriers to prevention. To do so effectively, standardised social science protocols that provide clear guidance on how to use qualitative and quantitative data collection methods are needed.

Panel 3: Closing the prevention gap in India: the Avahan-India AIDS initiative

In 2002, India was thought to have a rapidly expanding concentrated HIV epidemic driven by sexual transmission, mainly among sex workers and their clients in the south and injecting drug users in the northeast. To address this epidemic, the Bill & Melinda Gates Foundation launched Avahan, the India AIDS initiative, in December, 2003, with the goals to: build and operate a model HIV prevention programme to ensure, with the respective state governments, saturated coverage (over 80%) of core and bridge groups at scale (across a wide geographic area) in the six highest prevalence states in India (which accounted for 83% of estimated infections in India); serve as a catalyst for the Indian government and other implementers in the country; and enable replication of the programme and best practices by other institutions by fostering and disseminating learning from the programme.

Avahan began in 2003, working with over 185 local non-governmental organisations. Within 2 years, the project had scaled up to cover 280 000 female sex workers, high-risk men who have sex with men, and injecting drug users in 83 districts of the six states, with coverage in these states of over 80% of the target population. Services were also provided to about 6 million men at risk in solicitation venues and along national highways.

Why was such a rapid scale-up possible? Avahan focuses on targeting the groups at highest risks of acquiring and transmitting HIV, based on evidence from "knowing the Indian epidemic". Emphasis for programmes is on breadth before depth—ie, ensuring the establishment of a minimum package of prevention services across a wide geography for those at highest risk. Only when this is achieved can the focus turn to service intensity, quality improvement, and an expanded scope of services. Furthermore, a standardised service package, which is improved on the basis of lessons from implementation, ensures minimum quality, comparability of reporting data, and quality measures across the programme. Lastly, a relentless focus on implementing sound management principles—ie, recruitment of programme managers with business backgrounds (rather than technical); use of regular monitoring data analysis at all levels, coupled with intensive field oversight; and having systems in place for flexibility in fund allocation depending on ground realities—has had a key role in ensuring the success of Avahan.

The design and targets of the third National AIDS Control Programme of India has been greatly influenced by Avahan. One of the government's stated and funded goals under the new AIDS control programme is 100% coverage of all sex workers, high-risk men who have sex with men, and injecting drugs users in India.

Selection of prevention interventions

The effectiveness of any prevention programme also depends on the selection of the interventions included in it. Most new HIV infections in adolescents and adults are transmitted via sexual intercourse, and to a lesser extent through the sharing of needles among injecting drug users.²⁴ Abstinence, having safe sexual intercourse, or having unsafe sexual intercourse is usually an individual decision, but that decision is clearly affected by peers, family, community, and context.²³ Prevention programmes must therefore include a complex set of interventions and approaches—biomedical, behavioural, community—tailored to the specific context. When one considers the elements of a prevention programme needed to reduce the incidence of HIV among slum dwelling youth in South Africa, gay men in San Francisco, or female sex workers in Mumbai, the diversity of approaches needed becomes vividly apparent. Getting the mix right is critical.

Providing evidence for the effectiveness of a prevention programme is a much more complex task than proving the effectiveness of a drug, vaccine, or biomedical prevention intervention such as male circumcision.¹ Several systematic reviews have been published on HIV prevention interventions, mostly focusing on individual components or combinations of

interventions.^{25,26} Although informative, especially with regard to effectiveness of interventions for female sex workers and injecting drug users, these reviews have been of limited use for programme planners, particularly those addressing HIV prevention in generalised epidemics.

The most useful guidance for programme managers to help them select a mix of prevention actions is the UNAIDS practical guidelines for intensifying HIV prevention.⁵ However, the incompleteness of the evidence base informing this document is revealed by how often the arguments in favour of particular actions are based on the conventional wisdom of prevention experts rather than objective evidence. Since programmes informed by the same experts have so often failed, prevention planners clearly need a more complete database of what works.

To what extent are national programme managers or international funders guided by evidence of effectiveness? There are no indicators to measure this directly, and analyses of country programmes are limited in this respect. However, prevention strategies seem largely to ignore the existing evidence base because there is so little consistency in choice of interventions across countries with similar epidemiological and socioeconomic circumstances. The World Bank did a review of the national strategic plans for eight countries (figure 2 and panel 4).^{27,28} The lack of any apparent relation between intervention mix and seroprevalence strongly suggests that decisions about the mix of prevention interventions were not heavily affected by a common evidence base on intervention effectiveness and cost. Similar inconsistencies are observed among different funding agencies or for the same agency over time. Differences in policy with respect to harm reduction (in particular needle exchange, a prevention intervention with proven effectiveness) are most marked. For instance, in Australia needle exchanges are the cornerstone of prevention among injecting drug users.^{29,30} By contrast, this intervention receives no support in the USA and Sweden,^{31,32} despite it being strongly supported in the UNAIDS policy position paper² endorsed by its governing board. During the 1990s, US development assistance for HIV/AIDS provided priority support to both condom social marketing and treatment of sexually transmitted diseases; in recent years, the emphasis has shifted towards programmes focusing on abstinence and faithfulness.⁹ Such inconsistencies represent an obstacle for national programmes to develop strategic, evidence-based, long-term prevention strategies.

The most convincing evidence of the inadequacies of the current prevention response comes from the 2007 UNGASS reports.¹⁴ Countries reported that only 40% of young men and 36% of young women had accurate knowledge of HIV/AIDS, a slight improvement compared with 1999–2003 but far from the UNGASS

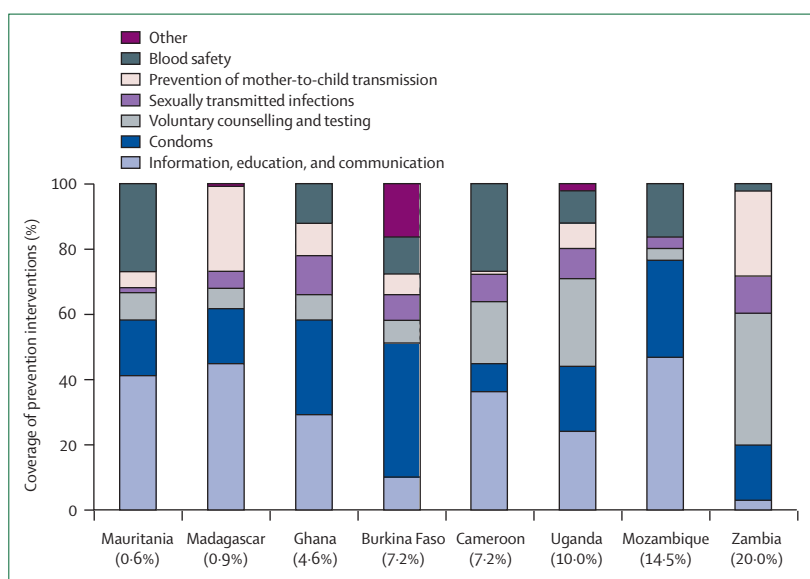


Figure 2: Percentage coverage of prevention interventions
Data from reference 27. Data in parentheses are prevalence around 1998.

Panel 4: Poor prevention planning: would I know it if I saw it?

The UNAIDS AIDS Strategy and Action Plan (ASAP), led by the World Bank, has developed a self-assessment tool for national AIDS programmes to assess the quality of their current national strategic plan. On initial review of current plans, most were deemed to be weak. Common shortcomings include the lack of involvement of affected communities in the planning process, lack of prioritisation, and weak or absent plans for monitoring the performance of implemented strategies.²⁸

target of 95%. Less than 70% of countries with generalised epidemics have implemented school-based HIV/AIDS education, and 61% have put in place HIV prevention for out-of-school youth. Where programmes exist, their quality has often not been assessed. No country reported implementation of a nationwide, comprehensive response for young people or sex workers. Globally, most injecting drug users and men who have sex with men lack meaningful access to multicomponent prevention services, irrespective of whether they live in a low level, concentrated, or generalised epidemic.²⁴

The lack of strong evidence for the effectiveness of different prevention programmes has several components. First, the evidence base is incomplete because many components of prevention programmes have never been systematically assessed, or the studies are discarded because they do not meet minimum design criteria. Randomised control trials are rare for prevention interventions, in part because of their complexity, ethical issues, low feasibility, and high costs. Further, such trials might not be the most

appropriate method to assess the performance of multicomponent, highly context-specific, prevention programmes that incorporate biomedical, behavioural, and structural activities. Several randomised trials on multicomponent behavioural interventions done in the past few years have shown negative results.^{33–35} Does observing no effect provide substantial evidence for the ineffectiveness of an intervention (the concept does not work in this context) or for the failure to show underlying effectiveness (assessment failure)?

Other important factors are also involved, besides the limitations of the evidence base itself. The multiple interpretations, and selective use (or non-use), of existing data magnify uncertainty and fan controversies. Since there is no consensus about whether promotion of condom use, abstinence, or faithfulness is more effective (and in what combinations) in reducing HIV incidence, that national media campaigns vary greatly in their emphasis is of no surprise (figure 3). However, one must not exaggerate the importance of debates over the relative effectiveness of interventions. Most countries, even those with generalised epidemics, are far from having achieved adequate coverage with basic and widely accepted interventions (eg, ensuring that youth understand how HIV is transmitted and prevented, universal access to condoms for casual sexual intercourse, that services for sexually transmitted infections are widely available, and that the police do not interfere with prevention efforts for men who have sex with men).

Also, lack of leadership or commitment to achieving prevention is not uncommon. Other competing priorities—eg, personal career advancement, or at least ensuring job security, or the need to use prevention programme activities to further political or party aims—can also be involved. Lastly, poor planning and weak implementation capacity also contribute to the implementation of an unsatisfactory mix of prevention activities.

How can the situation be improved? More information about the effectiveness and cost of different prevention activities and packages is needed. Unfortunately, this information cannot be generated in the offices of a global agency; it must come from the careful assessment of prevention activities and programmes in individual countries. However, this information is not going to be gathered if the knowledge about how to do rigorous assessments sits with experts in a few academic centres in high-income countries, because those experts are typically not present when prevention programmes are being designed on the ground. Thus, a major effort in capacity building is required for national and subnational programme managers and staff on how they can build effect assessment into their programme activities.

Better tools and guides are also needed to assess HIV prevention activities and programmes, especially for contextual or structural interventions as well as combinations of prevention methods. Because these types of interventions often do not lend themselves to experimental or probabilistic assessment designs, guidance is needed about how to adapt other assessment approaches to HIV prevention. Habicht and colleagues' work on plausibility designs^{36,37} is especially relevant and needs to be adapted for the specific context of HIV/AIDS. Methods should be developed to more rigorously consider plausibility evidence from several different settings where attempts have been made to implement similar interventions or programmes.

Because the results of assessments of the effectiveness of interventions will be of use to the global community, the availability of funding for such assessments must be assured. The creation of the International Initiative for Impact Evaluation (3ie) might serve as a useful mechanism to accomplish this end for some countries.

In far too many countries there is little or no connection between data collection efforts regarding knowledge of the epidemic and measuring the effect of specific activities, interventions, or programmes, and management information systems that track the delivery of services. These artificial separations make little sense and increase inefficiency. These efforts should be integrated and mutually reinforcing, taking advantage of the fact that the same data are useful for many purposes. Efforts to harmonise monitoring and assessment, as part of the Three Ones (a set of principles to guide the strengthening of national HIV/AIDS responses, endorsed by UNAIDS),³⁸ are an obvious venue to address this artificial separation.

A global and regional effort must be made to continually interpret the available evidence and experience and produce practical guidance for countries. These blueprints could include examples of common prevention approaches for different settings, based on the digested evidence and common sense. Plans should include the content of the interventions, as well as

For the International Initiative
for Impact Evaluation (3ie) see
<http://www.3ieimpact.org>



Figure 3: Billboard advertisement from Malawi

targets and standardised methods for how to monitor and assess them.³⁹

Many programme managers and their planning colleagues working on strategic plans for HIV prevention need to improve their capacity to use evidence on effectiveness and costs, to use information about their current programme capacity and coverage, and to model future epidemiological scenarios under different potential prevention strategies. UNAIDS, the World Bank, and other partners have begun to provide systematic training in the use of these strategies, but a very small proportion of managers have been trained to date, especially in larger countries where programmes are planned and implemented at the state level.

Lastly, global and national efforts are needed to better communicate the long-term, slow-moving nature of the epidemic. Short-term results are a more appropriate expectation for care and treatment of HIV/AIDS, but even so, one must plan for chronic treatment to achieve success in the medium term. In the case of prevention, the cause–effect cycle is even longer, and true success will only be measured in the medium to long term.

Delivery of prevention interventions

Even the best designed programme, with the ideal mix of interventions focused on the right populations, cannot effectively prevent HIV infection if implemented poorly. As the manager of any small company knows, there are potential gains associated with an inefficiently implemented programme when its performance improves and produces more from the same amount of resources; the size of such gains depends obviously on the size of the inefficiencies corrected. The private market is often ruthlessly efficient at removing inefficient producers, forcing them to either learn to become efficient or go out of business. However, such a situation is not the case in public health, and even less so in the prevention of any disease, not just HIV/AIDS. When there are no market incentives to impose discipline, results-based management becomes essential.

The potential importance of this issue has been shown by Marseille and colleagues.⁴⁰ Figure 4A shows the enormous dispersion of cost per client in a sample of voluntary counselling and testing sites in five countries. Independent of the size of the programme, the average cost per client receiving voluntary counselling and testing varied between US\$3 and almost \$1000. This variability is even more concerning because voluntary counselling and testing is one of the most standardised prevention interventions and because the testing sites were overwhelmingly located in urban or small urban areas in all five countries.

Figure 4B highlights the voluntary counselling and testing sites in India. By use of a very simple economic logic, it is possible to join the dots representing the most efficient sites—ie, those that provide services at the minimum cost given their size. This curve

represents a feasible efficiency frontier. All sites above the curve are providing services at a higher cost than they should given their size, and therefore the distance between any point and the frontier represent the size of the inefficiencies of implementation. In this particular example, India and Russia (figure 4B and C, respectively)

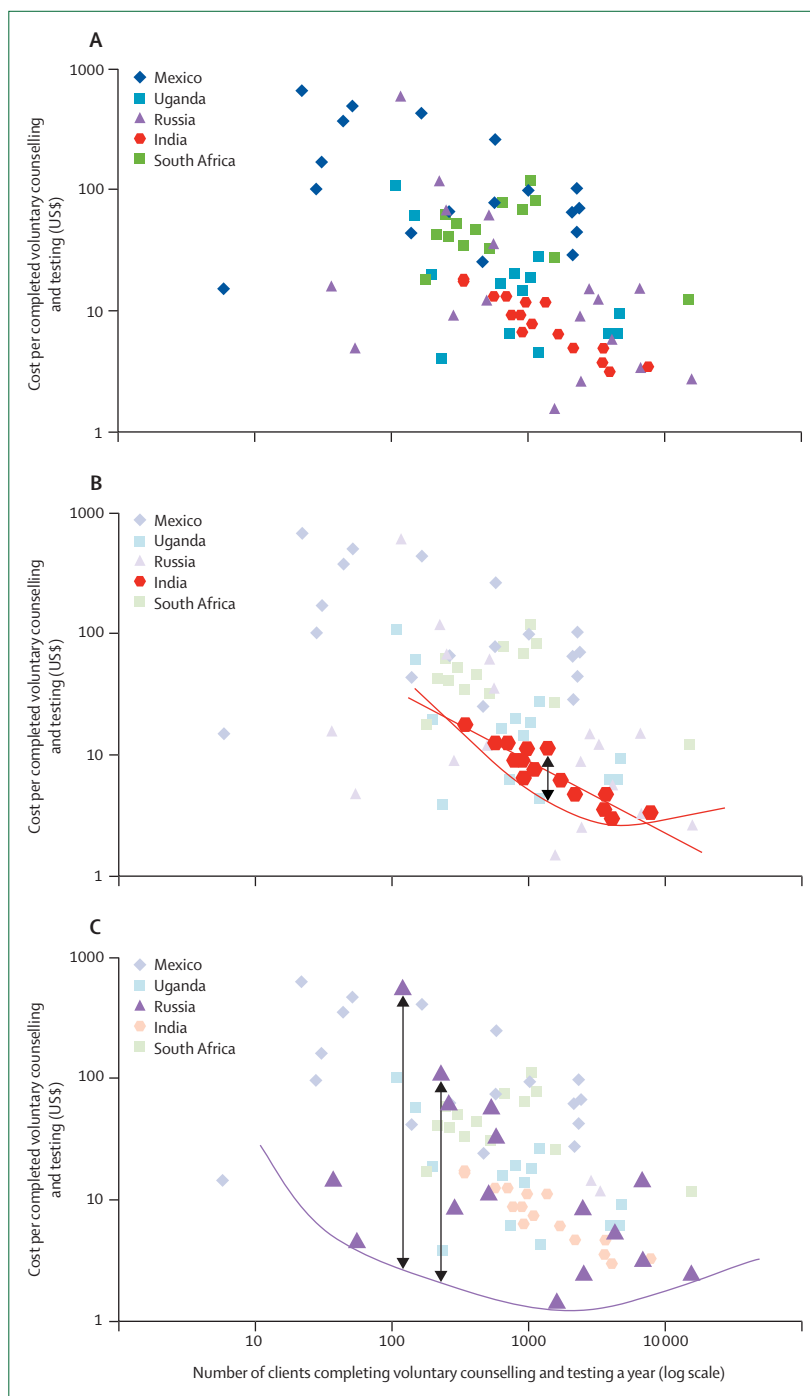


Figure 4: Variability of costs of voluntary counselling and testing by country
(A) In five countries, (B) in India, and (C) in Russia.

represent two extremes in terms of implementation performance and therefore in terms of potential gains associated with an improvement in performance. Differences in the characteristics and quality of the intervention could explain some of the variation observed, but with an intervention as standard as voluntary counselling and testing, such differences cannot explain variability of three orders of magnitude.

Very little data exist about the current level of implementation of HIV prevention strategies. However, the limited literature available suggests that suboptimum efficiency of implementation is very common. Economic theory supports this argument: in the absence of market pressure to motivate efficiency, if there are not explicit regulations and incentives in place, there is no reason to expect efficient behaviour. Management science comes to the same conclusion. The old adage that you cannot manage what you do not measure certainly applies here. Most organisations delivering prevention services do not even track their cost per client served, making the efficient delivery of services virtually impossible.

The size (scale) of the organisations and facilities delivering services is an especially important determinant of efficiency. A fully staffed, stand-alone voluntary counselling and testing clinic cannot possibly be efficient if it only serves a few clients a month. Relative to the demand of services faced, size of the implementation sites must be optimised to minimise waste. In a review of the economics of scaling up HIV services, Kumaranayake concludes⁴¹ that volume variation explains between 50% and 70% of the variation in costs across facilities for similar interventions. Another study suggests that volume predicts 25–95% of the variation in efficiency, depending on the intervention and the country examined.⁴⁰ This study found that doubling the volume of a site reduced average unit costs by around a third (between 2·4% and 58%). Dandona and colleagues⁴² found that doubling the size of voluntary counselling and testing services reduced the average cost by 50% in India. Data from Mexico also suggest increasing returns to scale in the provision of services related to voluntary counselling and testing, sexually transmitted infections, and information, education, and communication.^{43,44}

Suboptimum facility volume (scale) is clearly not the only source of inefficiency. At the management level, excessive centralisation and dispersion and excessive specialisation or integration can be inefficient. Similarly, inadequate performance incentives for staff and overstaffing can be wasteful.

Two root problems must be addressed to tackle the multiple and complex issues that lead to suboptimum responses. The first is an excessive focus on improving today's results within current human and infrastructure capacity. Such a short-term view ignores the need to increase staff and infrastructure capacity. For the short

term it does not make sense to invest in long-term incentives for quality control or in developing effective monitoring systems. The second problem is the paucity of information and skills. Most prevention programmes lack data to inform results-based management (as well as the knowledge and skills to ensure that essential data are collected), to interpret the data to guide management, and to develop management structures that can effectively translate managerial decisions into actions at the point of delivery.

How can we address these problems? Programme managers need to monitor the volumes, costs, and quality of prevention services delivered at the facility level. This information can be of enormous value to detect the most efficient sites (ie, those that define the efficiency frontier), the least efficient sites (ie, those that waste resources and need to be improved or closed), and to learn what the factors that characterise the most efficient sites are, and what rules or perverse incentives induce inefficiency or poor quality.

Donors should condition funding on the basis of results or performance. However, donors must carefully design performance-based indicators to avoid funding interventions of little value. Since quantity is often easier to measure than quality, incentive schemes can easily favour the former over the latter, as exemplified by problems with the recent scale-up of antiretroviral therapy, where performance premiums have been attached to the number of people receiving drugs rather than to the change in patients' life expectancy.⁴⁵

National programmes must actively strengthen managerial capacity at the delivery level. Technical capacity tends to be more important than managerial capacity when recruiting managers to implement prevention services. In many cases this imbalance is unavoidable, in which case these technicians must be offered the necessary help to develop as managers through the provision of appropriate training, tools, and supervision. The Avahan programme (panel 3) is an illustration of how involving staff with business backgrounds, and the use of intensive monitoring, coupled with intensive field oversight, can improve programme effectiveness.

In developing countries, the multiple, often-conflicting accountability and reporting requirements of donors can exacerbate the existing shortfall in managerial capacity. The problem is further magnified by donors who work with short funding cycles: the shorter the cycle, the more often the donor and recipient must reinstate time-consuming planning and budget negotiations. Short cycles also make the harmonisation of reporting requirements with other donors more difficult, can increase financial uncertainty, and can bias programmes towards generating short-term results. Donor coordination in funding a single national plan, in keeping with the Three Ones,³⁸ could substantially improve the current situation.

Donors should also build into their support programmes the investments in systems strengthening necessary to ensure sound management. Such investments include funding health and management information systems (including the ability to monitor the cost of service delivery), training and supporting staff to support such systems, and providing training for high-level managers in results-based management, in the design of monitoring systems, in assessment of effect, and in public accountability mechanisms.

National programmes must also relieve the bottlenecks in infrastructure and human resources that prevent efficient programme delivery. Donors must be prepared to support such efforts, even if the results will not be visible for several funding cycles. Needs will vary across countries, but a common thread will be the need to educate new staff, rather than just provide training to improve the skills of existing staff.

Lastly, programme managers should promote and support the development of incentives and rules to regulate performance at the facility level and to ensure accountability and transparency. Even the best-trained, best-paid, best-equipped staff will only be successful in acting efficiently if they work in an environment that provides the appropriate incentives and rules.

Optimisation of funding

The question of what the adequate level of funding is for an HIV prevention programme in a particular country is perhaps the most fundamental question that a programme manager must address. A programme manager in Botswana can justify needing more funding than a programme manager in Trinidad and Tobago because the epidemic is larger and less concentrated in Botswana than in Trinidad and Tobago, despite having similar sized populations and gross domestic product (GDP). However, the fundamental question of how many millions of dollars will be needed every year for prevention in a particular country remains inadequately answered virtually everywhere. At the most basic level, managers need to know how much the prevention of an additional HIV infection costs, and how much prevention of that infection is worth to the country in question (panel 5). If the cost is less than the value, more funds should be provided for prevention. However, such theoretical arguments are clearly not enough for programme managers, most of whom do not have defensible answers to the question of how much funding is needed. Planning efforts by countries are thus hampered, leading to wildly disproportionate requests for funds—eg, in 2005, Zambia requested over \$1 billion in the Global Fund to Fight HIV, Tuberculosis and Malaria's fifth round proposal process; their proposal scored low and was not funded.⁴⁶ By contrast, most other countries requested around or less than \$100 million. However, development of an improved version of UNAIDS' resource needs model⁴⁷ will not prove

Panel 5: Returns to scale in HIV prevention programmes

Returns to scale describes the relation between inputs and outputs in any production process. As the scale of a programme increases, a change in additional services is expected. If this change is more than proportional, it is said that the process has increasing returns to scale. If the change is less than proportional, then decreasing returns to scale are observed.

National prevention programmes, like individual prevention interventions, do not have constant returns to scale. Expectedly, as investment increases, the cost per infection averted initially declines (ie, it is more efficient to purchase additional prevention), until the returns to scale start to diminish and the cost per infection averted rises to the point that further investment is no longer justified given competing national or international priorities. Thus, to understand what scale is appropriate for their national programme, a manager needs to have an understanding of the relation between the overall level of investment in prevention and returns in HIV infections prevented.

The bottom line is simple—not spending enough is unwise because the potential returns to additional investment are extremely high; spending too much robs other, more worthwhile programmes of desperately needed resources.

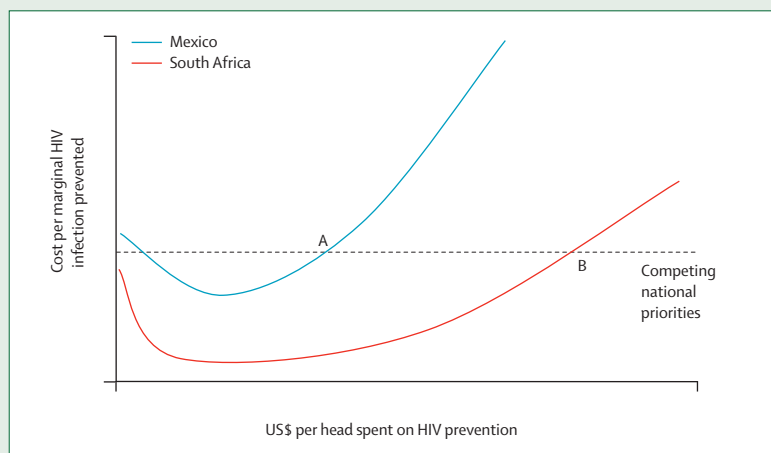


Figure 5: Returns to scale in HIV prevention programmes

Figure 5 presents hypothetical marginal cost curves for two countries, one with a highly concentrated (Mexico) and the other with a very generalised (South Africa) epidemic. Point A represents the maximum investment level justifiable in Mexico, point B the maximum in South Africa, given other competing national priorities. Clearly, per-head investment in HIV prevention should not be uniform across different populations or countries. In our example, assuming that funds are being used efficiently, averting an HIV infection should be less expensive, per head, in more generalised epidemics. However, this observation also implies that the level of total investment in prevention can be justified at much higher levels of investment: even though at point A for Mexico and B for South Africa the cost per infection averted is the same for both, the levels of investment are completely different.

sufficient; better answers for countries will only be possible with improved information about the returns to different prevention interventions and programmes at different scales and in different contexts.

What evidence is available for how close countries are to their optimum financing level for prevention? Data collected early in the response to the epidemic showed

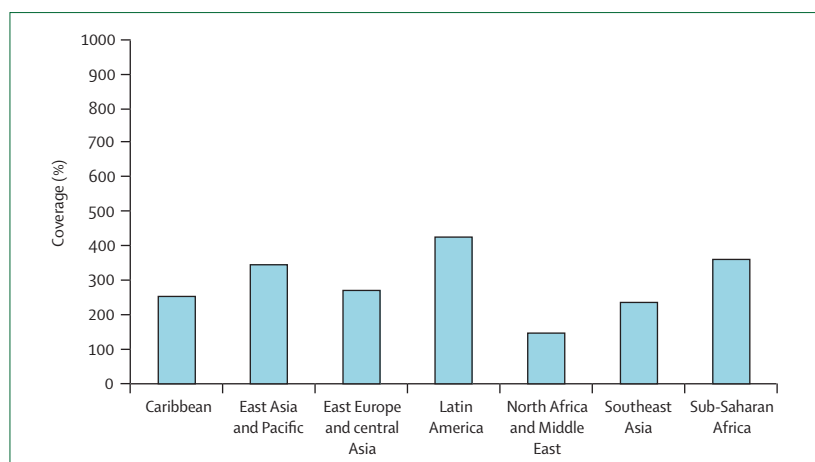


Figure 6: Coverage of prevention interventions in developing countries

Y-axis scale is sum of coverage of ten interventions (ie, $10 \times 100\% = 1000\%$).

that there was very little relation between per-head funding for HIV and two important determinants of what the funding level should be—HIV prevalence and GDP per head.⁴⁸ Preliminary analyses of data collected by UNAIDS suggest that the mismatch is now less extreme, but that there is still remarkably little correlation (Izazola-Licea JA, UNAIDS, personal communication).

Although high levels of unexplained variability suggest that funding is probably suboptimum, one cannot tell whether most countries' programmes are underfunded, overfunded, or a mix of the two. Yet there is widespread consensus that prevention is underfunded.^{4,49} This consensus is driven, in part, by the realisation that current commitments to provide universal access to treatment are unachievable and unsustainable in the absence of more effective prevention. However, there are some empirical data that also support the consensus.

Although there may not be any clear consensus about the value of preventing an HIV infection in different countries, an approximate value can be assigned as for other health interventions. The WHO Commission on Macroeconomics and Health suggested that interventions that purchased a year of healthy life for the same cost as a country's GDP per head or less were certainly worth funding and those that cost more than three times a country's GDP per head were probably not worth funding. The decision about funding interventions costing between one and three times a country's per-head GDP would depend on a particular country's commitment to public funding of health and the availability of funds.⁵⁰ Because of the global commitment to funding expensive treatment for HIV/AIDS, estimates suggest that prevention interventions that cost as much as \$4770 per infection prevented would not just be cost effective, they would be cost saving.⁵¹ If one adds to that the value of years of healthy

life lost because of an infection, as suggested by the Commission, then each infection prevented is of even greater value.

The Futures Group, funded by WHO, has done surveys of coverage of prevention interventions in developing countries (figure 6). According to the latest survey, even coverage of interventions whose cost-effectiveness is estimated to be below \$1000 per infection prevented (eg, prevention of mother-to-child transmission, peer interventions aimed at sex workers, treatment of sexually transmitted infections, etc)⁵¹ remains extremely low. Data from national programmes reporting coverage indicators suggest that in the past 2 years there have been important improvements in coverage in a number of countries,²⁴ but there is as yet no indication that there are countries with excessively large prevention programmes.

Unfortunately, why HIV prevention has been so underfunded has not been the subject of much rigorous analysis; we can only speculate as to the causes. HIV/AIDS is no different from other health problems in the sense that public policy favours funding to reduce the burden of disease in identified individuals in need of treatment over individuals who might contract the disease in the future. To this extent, the per-head GDP thresholds for spending suggested by the WHO Commission do not apply equally to preventive and curative interventions. The behaviour of all societies over centuries suggests that willingness to pay is higher for treatment than for prevention. The perception that a vaccine would be forthcoming further decreased the expected return to long-term investments in other types of prevention interventions (behavioural, structural, etc), since a vaccine might have rendered these investments moot.

The lack of sufficiently convincing data for the effectiveness of specific interventions and their combinations increases the risk that funds spent on prevention will not provide demonstrable benefit. A risk-averse decision maker will prefer smaller, certain returns to larger, less certain returns to investment, biasing funding away from prevention. Highly visible debates regarding the relative importance of different interventions (eg, circumcision vs condom promotion vs reduction of concurrent partnerships) can also provide an alibi for inaction. Additionally, short political cycles bias public policy in favour of expenditures that will produce visible returns in the short term, and thus against prevention interventions that produce their results in the medium to long term.

HIV prevention requires addressing sex and drugs. In view of the associated political risks, policy makers are naturally reluctant to advocate for HIV prevention programmes that are larger than the programme scale demanded by the public. Thus, rather than leading the public, decision makers are likely to lag behind public opinion. This bias, like the others outlined above, does

not just refer to preferences at the national level; the same biases (low-risk, short-term, politically safe, etc) affect investments by the international donor community.

Lastly, it is difficult to raise additional funds without a well defined and defensible target of how much is needed. Current estimates of resource needs are crude. They estimate the cost of scaling up a fixed set of interventions to predetermined coverage levels that are shaped much more by what is operationally feasible than by the characteristics of the local epidemic. They also assume constant unit costs independent of scale, contrary to what both the theory and the evidence suggest is the case.

What can be done? Poorly designed and poorly implemented prevention programmes require vastly more funding to achieve the same results as do those that are well designed and managed. Yet improving programme design and management costs money because both information and capacity must be improved. Thus, funding for programme implementation must be considered separately from that for improving programme effectiveness and efficiency.

In terms of funding for programme implementation, UNAIDS estimated that total resources available for HIV/AIDS have grown from less than \$300 million in 1996 to almost \$8300 million in 2005.²⁴ Development assistance programmes like the Global Fund, the US President's Emergency Plan for AIDS Relief, and the World Bank's Africa Multi-country AIDS Program has helped to channel assistance to the countries in most need. However, prevention spending has grown much less than spending for treatment.⁵²

From where can countries mobilise additional funds for prevention? In the first instance, most countries should dedicate greater national financial and human resources to HIV prevention. However, although the solution is evident, how to achieve it is not. The global community can help in several ways. First, it can foment greater awareness among citizens everywhere of the need for more and better prevention so that they demand greater efforts from their governments. Second, multilateral institutions can do a better job of monitoring and disseminating information about the relative levels of funding of prevention programmes by national governments and what services those programmes are delivering. Revealing important gaps strengthens the hand of both citizens and donors to insist on changes in government prioritisation of prevention. Third, more can be accomplished if sectors do not expect all HIV/AIDS-related prevention activities to be funded by an HIV/AIDS budget. Including HIV/AIDS education in a school curriculum would be justified even if only to learn about history's largest epidemic—there is no reason for the cost not to be part of the regular education budget.

The second source of additional funds for prevention programme implementation is the global donor

community. The most obvious sources within that community are governments of high-income countries that are currently providing trivial funding to the global HIV/AIDS effort. Figure 7 shows the relative generosity in 2005 of the 12 largest donor governments, both as a proportion of their total GDP and in total contributions. Disparities are evident: Norway, for example contributes almost four times as much as Italy, despite having an economy that is about a sixth the size;⁵³ the Netherlands contributes more than six and half times as much as France, although its economy is less than a third as large.

Some developing countries receive far more external assistance relative to need than do others. To reduce the mismatch, donor governments should channel a greater proportion of their assistance through multilateral mechanisms such as the Global Fund and the World Bank, where funding decisions are more insulated from domestic political agendas. Multilateral and bilateral agencies must also work with especially disadvantaged countries to strengthen their capacity to raise funds, to manage effectively, and to invest in their infrastructure, enabling them to implement at larger scale.

The international community must also do a better job of measuring and documenting successful national prevention efforts. Evidence that funds previously expended are having a beneficial effect on the epidemic is perhaps the best way to argue for additional funds. Not having such evidence available strengthens the hand of those who would rather spend the funds on other priorities.

In terms of funding for improving programme effectiveness, the specific areas in need of funding are addressed in the previous sections—eg, epidemic information systems, the need for better data for

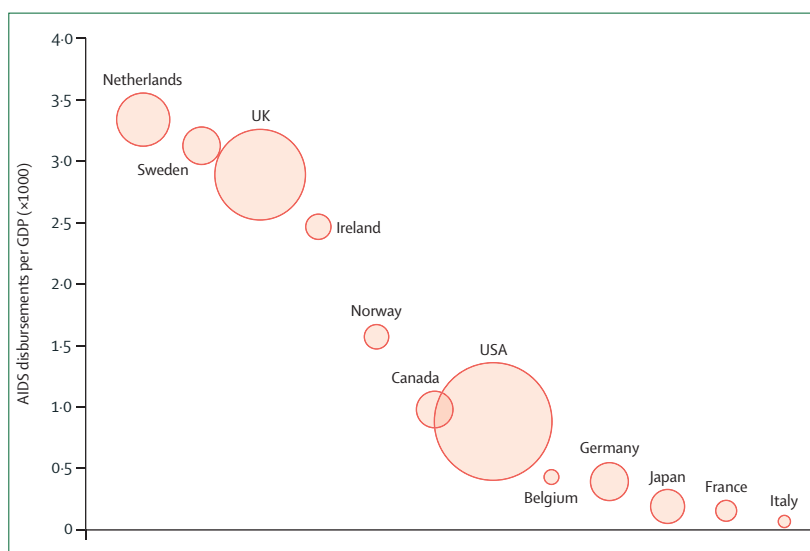


Figure 7: Relative generosity of the 12 largest donor governments in 2005
Size of circle is proportional to contribution.

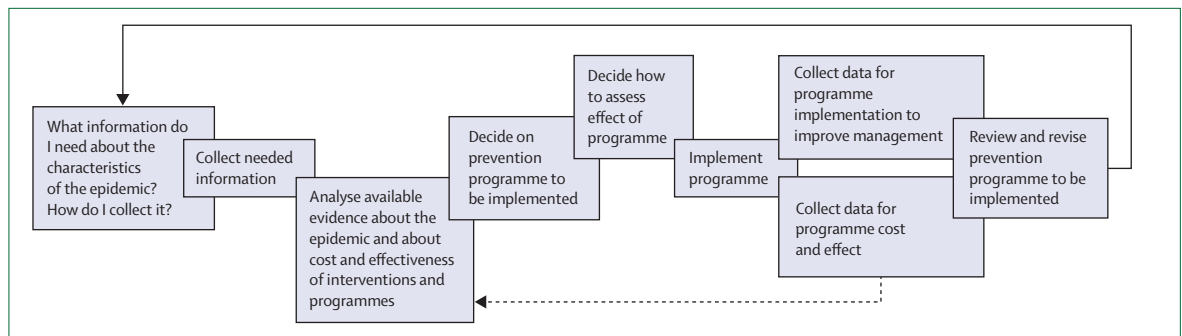


Figure 8: Flow diagram of the HIV prevention planning cycle

intervention effectiveness, and the need for management information systems. Investments in epidemic and management information systems occur at the national (or subnational) level and will logically be funded there. By contrast, the funding for development of new biomedical, behavioural, and structural interventions; for evaluation of the effectiveness and effect of the interventions being implemented; and for sharing of information, tools, and lessons learned among countries cannot be left to individual countries. Global cooperation will be required, since there are insufficient incentives for any individual country to invest sufficiently in the production of such evidence. This lack of incentives has not been a major obstacle to investment in the development of biomedical interventions, where individual countries have made major investments (eg, the US National Institutes of Health in HIV vaccine development). The same is not true for investment in the development or assessment of behavioural and structural interventions or for investment in learning how to best manage programme design and implementation. In the absence of adequate responses from national research agencies, a global effort is required to increase such investment, possibly by guaranteeing a proportion of international development assistance for HIV/AIDS for that purpose.

Conclusions

The past 25 years of HIV prevention have been characterised by islands of success in a sea of failure. Millions of people would not be newly infected each year if that were not the case. Our challenge now is to start doing more prevention, better. We must also ensure that the situation improves each year as researchers develop more effective interventions, programme evaluators learn about what works best, where, and for whom, and managers learn how to deliver services more efficiently. Although we still hope that a magic bullet will one day be discovered, we must now start designing and implementing prevention programmes that can succeed without one.

We believe that disaggregation of HIV prevention measures into the four key areas highlighted here could

be useful in making prevention work. The four areas are important because they are vitally interdependent. Indeed, a programme manager who fails in any one dimension will leave a failed programme as a legacy. However, by addressing each dimension independently in turn, he or she may well identify actions that are easy to implement and that could substantially improve performance both of a particular dimension and, in turn, the overall programme.

As highlighted by figure 8, the production and use of information, evidence, and data are critical to every step of the programme cycle. We propose a number of specific recommendations to move forward the development of methods for prevention and capacity for the generation of evidence, the generation of evidence itself, the development of the means to use this evidence to improve the planning and implementation of programmes, and, to a lesser degree, on how to remove blocks to efficient programme implementation. New technologies to measure HIV incidence must be developed, and a broader spectrum of information must be included as part of the bulk of evidence that can be used to design prevention programmes. Software and other tools to help managers to analyse and synthesise more information are essential. Programme managers must be given more guidance about data collection priorities; furthermore, a proportion of international development assistance for HIV/AIDS must be protected for the generation of evidence on effectiveness and the cost of interventions and programmes. Training efforts should be substantially expanded, and funding must be conditional on results-based management. Education—not just training—must be funded to relieve personnel shortages; donor reporting requirements should be harmonised, and technical assistance provided to low-income countries to improve their ability to apply for development assistance.

We do not pretend that our information-focused approach to making prevention programmes work is a sufficient answer to how to improve the performance of prevention efforts worldwide. However, the world's short-sighted approach to HIV/AIDS in the epidemic's first

25 years has severely handicapped the response, largely because we have not learned enough about what prevention approaches work best, where, for whom, and why. Correcting the information deficits can help to reverse the handicap and potentiate the response. At the same time, imperfect information today is no excuse for inaction. Scaling up prevention interventions with known effectiveness, such as harm reduction and sex work interventions, remains an urgent public-health priority. Furthermore, taking the risk of rolling out large-scale programmes of combination prevention, despite their uncertain effectiveness, is the only way we can understand their effects and learn how to improve them.

Conflict of interest statement

AC is the vice chair of the board of the International Partnership for Microbicides and will become a board member of the International AIDS Vaccine Initiative this year. He is also the executive director of the Infectious Diseases Institute, a non-profit institute owned by Makerere University, Kampala, Uganda. ML, SB-A, and SMA declare that they have no conflict of interest.

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