



Financial resources required to achieve universal access to HIV prevention, treatment, care and support

An Analysis of the Incremental Programme Costs: General Methodology and Assumptions

*Benjamin Johns and Matthew Gordon
in consultation with*

*WHO/HTM/HIV, WHO/EIP/FER, and UNAIDS
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Methodological Annex- VIII

Introduction

This document presents the methods and assumptions used to estimate the incremental programme-level resources needed for scale up of key HIV/AIDS prevention and treatment interventions, and is part of the larger effort to estimate the global resource needs for HIV/AIDS for the years 2006 to 2008.

Programme costs are defined as the “system” level costs above the point of contact with the patient or members of the target population. They are essential for the delivery of basic services to ensure informed programme planning and decision planning, effective and efficient operation, standardization and quality, increasing demand for services. Specifically, they include the costs for:

- Programme Management (for both prevention and treatment);
- Supervision and tracking;
- Short-term in-service training;
- Communication and Advocacy (to raise awareness of interventions among the population or among policy makers);
- Monitoring and Evaluation;
- Operational Research;
- Supply Chain;
- Upgrading Laboratories and other Infrastructure;
- Development and building of new health facilities.

In previous estimates of the global resource needs for HIV/AIDS, these costs were estimated by including training and supervision in the unit costs for prevention (which still holds for these estimates) and subsequently, for both treatment and prevention, adding 5% of total costs to account for policy, advocacy and operational research; adding another 5% to account for administration (programme management); and finally, adding 5% to account for monitoring and evaluation.

The current effort reflects a deliberate consideration of the barriers to rapid scale up for HIV / AIDS from the systems perspective, and possible responses. They allow for the consideration of investment as well as running costs of a support structure. Thus, these estimates are more "realistic" because they incorporate the concept of fixed costs and resulting economies of scale, and the level of specification permits the identification of inputs that can be synergized (or made redundant) by simultaneous scaling up of programmes.

These estimates include the costs of upgrading health facilities, but exclude the production of health human resources. They exclude systems level costs incurred above the country level (i.e., resources needed at the regional or global level to support scale up).

The paper is organized as follows:

- A general methodology section outlines the basic approach and methods used to derive these estimates;
- A section on the broad classification of countries used in calculating costs outlines the different classification methods used to categorize countries when assessing needs;
- A section detailing the assumptions used to cost events common across many activities;
- A section defining the activities required;
- And, a long section giving specific details and assumptions for each of the activities costed.

The paper concludes with a presentation of the results of this analysis and a discussion of further work proposed.

General Methodology

The results reflect an assessment of the *incremental* costs to enable rapid scale-up. Thus, they do not reflect the total amount of resources used in programme-level activities for HIV/AIDS. The costs are calculated based mostly on inputs as determined by expert opinion.

The methodology reflects the reality that cost structures are different from country to country. Thus, country level prices are used, and multiplied by the quantities needed in each country (i.e., using an ‘ingredients’ approach). Thus, basic activities that are needed in every country (no matter the population or population in need of HIV/AIDS interventions) can be included as well as activities that will vary in intensity based on the number of people served, with consideration for the need for each type of activity varying by country.

The data sources for these estimates are:

- Quantities
 - Interviews with international experts (WHO) on *best practices* needed in order to identify activities needed;
 - Review of GFATM proposals, previous work on costing (CMH, MP);
 - Adjustments of input quantities based on the country's classification (based on current and target coverage, GDP, etc.);
- Prices: WHO-CHOICE databases; review of previous work¹.

The quantity of goods needed derived from interviews are rechecked after initial calculations to ensure reasonableness.

¹ Johns B, Baltussen R, Hutubessy R. Programme costs in the economic evaluation of health interventions. Making choices in health: WHO guide to cost-effectiveness analysis. Geneva: World Health Organisation, 2003.

Costs are thus built up country by country to reach regional totals. However, since data at the country level is at this point missing, taking an average of these costs across countries in the region may not reflect actual need in that country. The effort intends to reflect a regional or global need only. Costs reflect a provider, or health services, perspective and do not attempt to capture costs incurred at a patient level or other level outside of the health services sector. As such, costs reflect actual, or financial, costs and do not attempt to capture the opportunity costs of the activities involved². Finally, these costs reflect the activities required to support the interventions deemed appropriate by the two committees guiding effort to estimate the global resources needed for HIV/AIDS. Although individual countries may engage in activities outside this list of interventions, or may not have adapted the full list, no attempt has been made to capture these variances.

Broad Classification of Countries Used in Calculating Costs

The assumptions underlying the incremental resource needs for programmatic (or systems level) activities rely on several classifications of countries, which are listed below. These classifications are intended only as rough indicators for the calculation of global needs, and may or may not accurately reflect needs in individual countries³. Further explanation of how these classification systems are considered is detailed under the specific activities.

Classification system 1: Income-level

The calculations use the World Bank's classification of countries income level as a proxy for the general level of infrastructure development. These classes are judged to relate most closely to preventive activities outside the immediate purview of the health sector (for which CMH—see below—classifications are used). Three classes are considered: Low-Income, Low-Middle Income, and Upper-Middle Income. High income countries are not considered in this estimate.

Classification system 2: The Commission on Macroeconomics and Health (CMH) assessment of health system strength

The CMH classified developing countries into 4 quartiles, based on variables indicating the overall strength of the health system, with quartile 1 being countries with the weakest health systems (the greatest constraints to scale-up) and quartile 4 the strongest. This classification is used to determine need for activities closely related to the health interventions delivery system.

Classification system 3: Type of epidemic

Four different epidemic types were considered, based on the prevalence of HIV seropositivity: High, Medium, Low (Concentrated), and Very Low. This classification is general used to determine the extent or concentration of activities needed. For some

² Currently, cost estimates do not adjust for inflation.

³ Further work on gathering country-level data is needed to increase the precision of the estimates. Long-range plans include country-level data gathering.

categories of cost, a slightly different classification system was used: Generalized, Concentrated and Low.

Classification system 4: Coverage levels

The extent of planned scale-up is used to estimate the amount of need for activities within a country, with more ambitious scale-up assumptions requiring more resources.

Classification system 5: Number of patients projected to need or be on ART / Number of people identified to be HIV+

The number scale of activities needed is estimated based on the size of the response that will be needed.

Cost for Common Events

Some measures or events reflect similar costs across the general activity groups. These events are described here, and referred to in the general descriptions by the heading used to label them here.

Yearly costs for stationary and office supplies

A basket of goods have been selected to represent the annual usage of stationary and office supplies by a typical worker. This basket is not meant to reflect actual usage; rather, it is intended to reflect the typical costs incurred by a staff member over the course of one year. Additionally, accommodations have been made for capital purchases of office equipment for newly hired staff, including computers, printers, voltage stabilizers, etc.

Production and distribution of printed materials (guidelines, research findings, etc.)

Costs consists of 4 consultant days for design, layout and pre-production, distribution of 10 to 50 copies to every district in the country, and printing costs of 30 pages per publication.

Development of technical materials (guidelines, research findings, etc.)

Costs consists of 20 consultant days, plus 4 extra days of consultant time if data analysis is required.

National Level Meetings and Reviews

A set of 3 meetings, each lasting 3 days, with 5 national experts and one expert from every province in a country, plus one consultant for the duration of the meeting and refreshments/food.

Workshops

3 day meetings with 5 national experts and one expert from every province in a country, plus refreshments/food.

Activities Considered

These estimates include separate estimates for the following activities, with the assumptions used for each activity further described in the next section.

1. *Programme Management for Preventive Activities*: Includes programme planning and management. This activity considers a coordinated action plan for prevention and treatment at the district level, but acknowledges the need for separate planning and management of preventative activities at higher administrative levels.
2. *Programme Management for Treatment and Care Activities*: Includes programme management for facility and community based care and treatment.
3. *Communication and Advocacy*: Includes the costs for raising awareness in the general population for the availability of services to generate demand for those services. This section also include advocacy to raise awareness for the need to implement or change policies.
4. *Monitoring and Evaluation*: Includes costs for the strengthening and planning at a central level, strengthening activities at local levels, and increasing the use or effective use of surveys and studies.
5. *Operational Research*: Includes the costs for collecting data on programme implementation, analysis of results, and dissemination of findings.
6. *Training for Treatment and Care*: Includes the costs of in-service (or 'on-the-job') training activities at hospitals, health centres, laboratories and other health service delivery points, as well as at the community level. Honorariums paid to workers in the community are considered here⁴. Excludes the costs of training ("producing") new health workers.
7. *Increasing the Capacity of Logistics and Drug Supply Systems*: Includes costs for coordination and management of a logistics systems, new vehicle purchase and maintenance (for distribution of commodities and supervision), ensuring adequate communications systems, and storage of 2nd line drugs.
8. *Upgrading Laboratory and Infrastructure Capacity*: Includes the costs for upgrading the physical condition of health service delivery points to accommodate the delivery of ART and the purchase of new equipment (including training on new equipment).
9. *Development and Building of New Health Facilities*
10. *Supervision for Treatment & Care*: Includes the costs of supportive supervision to monitor programme implementation, with costs for problem solving and support considered⁵. Also includes costs for setting up and overseeing a patient tracking system.
11. *HIV Drug Resistance Surveillance*: Includes costs for establishing drug surveillance and monitoring activities.

⁴ At present, only the costs for training for treatment and care are considered since the unit costs used in for the prevention activities include training and supervision.

Note that these costs include only activities at the country level; they do not capture the additional costs of regional or global support that are necessary to achieve scale-up goals.

Scenarios Considered

Two scenarios were considered: costs if “historical growth rates” continue into the future and costs if “universal access” goals are achieved, in line with scenarios developed for the treatment module of the global costing exercise. The assumptions used under each scenario remain the same; the projected number of patients needing care is adjusted for each scenario.

Validation Process

Initial results and assumptions were shared with representatives from twelve countries (Brazil, China, Democratic Republic of Congo, Ethiopia, Egypt, Haiti, India, Kenya, Nigeria, South Africa, Russian Federation, Tanzania, Ukraine, Zimbabwe). Comments received from these countries that were applicable in all settings were incorporated into the assumptions below. In addition, adjustments were made specifically to reflect feedback from two countries, as follows:

Democratic Republic of Congo: The number of health facilities needing to be upgraded was adjusted to reflect country level plans, and the costs for land is removed since the government has already procured the land. The number of provinces and districts was updated to reflect the most recent political restructuring.

South Africa: The country representative reported that training has already progressed further than assumed by the model, and number of people needing training was marked down by 20%.

Assumptions Used in Determining the Quantities Needed for Activities

The assumptions outlined below were based on interviews with programme experts within WHO. The interviews were structured around activities that were listed in successful applications to the Global Fund for HIV/AIDS.

Programme Management for Preventive Activities

New Staffing Needs: The need for new staffing is based on the coverage levels, by intervention. The interventions are divided into three types: those targeting the general population, those targeting special populations, and those delivered through the health service system. Crossing coverage levels of 25%, 50%, and 80% are all assumed to need additional staffing (for example, scaling up a prevention programme from 30% coverage to 40% coverage is assumed to NOT need additional staffing, while increasing coverage from 40% to 60% is assumed to need additional staffing).

At the provincial level, one programme manager is needed for each intervention in each province regardless of coverage. Programmes that currently have very low coverage are also allocated an additional programme manager at the national level. In addition, community coordinators are considered for *each* of the preventive interventions targeting special populations. Support staff for each programme manager is determined as follows:

| Number per Programme Manager | Job Title |
|---|--|
| 0.5 | Administration Officer |
| 0.25 | Clerical Officer/Administrative Asst. |
| 0.25 | Personnel Secretary/Asst./Receptionist |
| 0.25 | Accountant |
| 1 | I.T./Computing Officer |
| 0.25 | Cleaner |
| 0.25 | Medical Officer |
| 0.25 <i>(only per national level programme managers)</i> | Public Health Specialist |

All levels of staffing in countries with Very Low or Low epidemics are half of those outlined above.

The number of provinces needing staffing is determined based on the number of provinces that need to be covered to access the percentage of the population covered in

Worked example of using coverage levels to determine staff need:

Base parameters:

- (1) Number of individual programmes crossing over 25% coverage threshold: 3
- (2) Number of individual programmes crossing from above 25% coverage to over 50% coverage threshold: 2
- (3) Number of provinces needed for a programme to cover 25% of population: 6
- (4) Number of provinces needed for a programme to cover 50% of population: 15
- (5) Additional managers required per province per programme for each step up in coverage: 1

Calculation:

- (6) $(1) * (3) * (5) = 18$ provincial managers in 6 provinces for 3 interventions needed
- (7) $(2) * [(3) - (4)] * (5) = 18$ provincial managers in 9 additional provinces for 2 interventions
- (8) Total staff needed = $(7) + (6) = 36$.

the scale-up goals, with further outreach at the district levels to ensure wide coverage within each province. In other words, different levels of coverage within a province are not considered. Further, costs for the provincial level staff described above are considered only for countries with a population over 30 million.

At the district level, one half of a full time equivalent (FTE) programme manager is assumed to be needed, based on the same schema used for provincial level staff. This staff is assumed to cover activities for treatment and prevention in an integrated manner. However, 1 full-time coordinator for each of the interventions targeting special populations is assumed necessary in each district. In addition, each programme manager at the district level is assumed to utilize 0.5 FTE administrative officer and clerical officer/assistant.

All staff are supplied with yearly costs for stationary and office supplies, including computers and printers.

Vehicle Need: One vehicle for each district level programme manager in low income countries (assumes 4wd drive in countries outside of Europe and the Americas, and a car in Europe and America). Additionally, one motorcycle per district in low-income countries, and one per every 4 districts in middle income countries. Cost of fuel is estimated based on the size of the country, assuming regular usage of the vehicle. 15% of purchase price is assumed yearly for maintenance.

Engage Technical Assistance on for trouble shooting: For each intervention crossing a coverage threshold, it is assumed one technical assistance meeting (above and beyond

normal supervisory activities) are needed to expand coverage, per year. Costs include 5 days per diem and travel costs for national experts, and 2 days per diem for international consultants.

Other activities needed to support the development and maintenance of a common policy framework and resource materials are considered on-going.

Development and maintenance of a quality control system: Activities specifically for those interventions targeting special populations or delivered through the health service system are considered:

- Disseminate service delivery quality control guidelines: For every intervention that starts from a very low coverage level. Costed as *Production and distribution of printed materials (50 per district)*.
- Support district supervisors make observations using checklists on service provision: For each province, training and refresher training for use of checklists, for 3 days with consultant rates used for teacher reimbursement.
- Support District supervisors conduct exit interview: For each province, training and refresher training for use of checklists, with 5 days of national expert per diems and 3 days consultant time for each training.

Establish and maintain partnerships and linkages: Cross cutting activities within and external to the health system to unify in the effort to fight HIV/AIDS, including:

- Support regular meetings at different levels: 3 additional meeting at provincial level (15 attendees in each province), plus 4 additional meetings at district level per year (15 attendees in each district).
- Health information systems-uniform record systems: Meetings and research to unify and train people on a uniform record keeping system across delivery points. Costs include: 2 *National Level Meetings and Reviews*, *Development of technical materials*, *Production and distribution of printed materials (50 per district)*, 4 consultant days for instrument adaptation, and 3 day training for staff at facility level.
- Linking to systems: establishment & maintenance of communications network. Costs include yearly e-mail charges, and 10 days training in newly covered provinces.

Support to enhance district coordination: Assessments of NGOs, community conversation sessions, and identification and support of community groups at the district level. Costs include transport and quarterly input from consultants.

New Staffing Needs: The need for new staffing is based on the coverage levels. New provinces and districts are added based on the average number of patients per province at full coverage vis-à-vis current number of patients on ART.

All countries are considered for support at the provincial and district level, with additional national support for countries with currently less than 10% coverage (based on provincial need). The additional staffing needs for a province scaling up from one coverage band to another are as follows:

| Number per Province | Job Description |
|--|---|
| 1 x size multiplier A | Professional staff for administration and personnel |
| 1 x size multiplier B | Professional staff for finance |
| 1 x size multiplier A | Professional staff for record keeping |
| 1 x size multiplier A | Professional for maintenance, infrastructure, and logistics |
| 1 x size multiplier C | Programme management staff |
| 1-2 times number professional staff | Support and general staff |
| Number per district | Job Description |
| 4 | 1 staff each for the first 4 categories listed under province |
| 1 x size multiplier D | Programme management staff |
| 1 times the number of professional staff | Support and general staff |

Number needed is based on the number of patients to be treated in each province/district as follows:

| Number of patients needing ART | Multiplier | | | |
|--------------------------------|------------|-----|------------------------------|-----|
| | A | B | C | D |
| <400 in country | 0 | 0 | 0 | 0 |
| <500 per province | 1 | 1 | 1 | 1 |
| 500 – 10 000 per province | 2 | 1.5 | Scaled linearly from 1 to 15 | 1.5 |
| > 10 000 per province | 3 | 2 | Scaled linearly from 1 to 15 | 2 |

District staff are excluded from large, middle income countries with low patient burden. Staff job descriptions are indicative only; they will naturally vary according to country level systems. Staff are assumed also to provide input into reporting mechanisms in-line with various donors and national requirements.

All staff are supplied with yearly costs for stationary and office supplies, including computers and printers.

Vehicle Need: Two vehicles at each provincial level plus 1-3 vehicles (multiplier A) based on number of patients in low income countries (assumes 4wd drive in countries outside of Europe and the Americas, and a car in Europe and America). Additionally, two vehicles per district in low-income countries, and one per every 4 districts in middle income countries. Cost of fuel is estimated based on the size of the country, assuming regular usage of the vehicle. 15% of purchase price is assumed yearly for maintenance.

AT NATIONAL LEVEL: Develop and Maintain a common policy framework and resource materials: Develop policies (meetings, workshops, and consultants), revise draft guidelines (meetings and consultants), and disseminate policy and guidelines in countries with under 10% current coverage. Costs include 3 *National Level Meetings and Reviews*, *Development of technical materials*, 2 *Production and distribution of printed materials (50 per district)*, 4 consultant days for instrument adaptation.

Strengthening the curricula for the pre-service health teaching institutions is considered in countries with medium and high prevalence. Costs include 2 *National Level Meetings and Reviews*.

For the expansion number of hospitals and health centres (see assumptions under *Upgrading Laboratory and Infrastructure Capacity*), it is assumed one technical assistance meeting (above and beyond normal supervisory activities) are needed to expand coverage, per year. Costs include 5 days per diem and travel costs for national experts, and 2 days per diem for international consultants.

Establish and maintain partnerships and linkages: Cross cutting activities within and external to the health system to unify in the effort to fight HIV/AIDS, including:

- Support regular meetings at different levels: 3 additional meetings at national level (15 attendees at each).
- Strengthen existing referral system: establishment & maintenance of communications network, including purchase of computers Costs include yearly e-mail charges, and 10 days training in newly covered provinces.
- Support Technical Working sub-Groups on interventions to hold meeting regularly: *National Level Meetings and Reviews*.

Human resource planning: At the provincial level, systematic mapping of health service delivery systems, focusing on the ability of human resources to meet demand, coordinating task shifts and other efficiency measures, etc. Cost include *National Level Meetings and Reviews, Development of technical materials, Workshop, and Production and distribution of printed materials (1 per district)*.

AT DISTRICT LEVEL: Coordination and making plans: 3 meetings per year with 30-40 attendees for making plans, midyear evaluations, and final reporting. 1 meeting every quarter of monthly for staff meetings. *Cost include meeting costs.*

Communication and Advocacy

New Staffing Needs: One set of staff at the national level for every intervention currently below 10% coverage, as follows:

| Number per Province | Job Title |
|----------------------------|---|
| 1 | Coordinator |
| 1 | Social Communicator |
| 0.5 | Administration Officer |
| 0.25 | Clerical Officer/Administrative Asst. |
| 0.25 | Personnel Secretary/Asst./Receptionist |

All staff are supplied with yearly costs for stationary and office supplies, including computers and printers.

Planning of strategic communications plan: For each intervention starting from very low coverage (<10%), and for interventions moving from below 80% coverage to over 80% coverage, it is assumed that new strategic communications plans will be undertaken, including the following costs:

- Formulation of strategic communication plan (*National Level Meetings and Reviews*).
- Production and distribution of strategic communication plan, including evaluative research and pre-testing of messages (including *Production and distribution of printed materials (10 per district)* and 6 days consultant costs each for evaluative research and pre-testing).

Specific outreach activities for each of these interventions are based on the following assumptions (all prices include costs of development):

| Type of Activity: | Number per intervention: |
|--------------------------|--|
| TV Commercial | 1 every 2 weeks |
| Radio Message | 2 per week |
| Leaflets/Flyers | 2 per 100 population, yearly |
| Posters | 4 per hospital and 2 per health centre, yearly |

Advocacy: One advocacy campaign for each intervention currently below 10% coverage, including the following costs:

- Formulation and review of advocacy strategy (*National Level Meetings and Reviews*).
- Production and distribution of advocacy strategy (*Production and distribution of printed materials (10 per district)*).
- Advocacy Events (including 12 meetings [for 25 people] per year, and 3 public events [targeting 9 high level officials and 5 media outlets per year]).
- Production and distribution of advocacy materials, including brochures/leaflets, pens, information kits, (5 of each for every person attending and advocacy event) and 1 the development of one film documentary.

Monitoring and Evaluation

New Staffing Needs: The staff sets required at provincial and district levels are described below. The percentage of provinces or districts needing staffing is determined by the following table:

| Income Class | CMH Health Infrastructure Quartile | | | |
|---------------------|---|-----|-----|-----|
| | 1 | 2 | 3 | 4 |
| Low-income | 100% | 75% | 50% | 25% |
| Low-Middle Income | 75% | 50% | 25% | 10% |
| Upper-Middle Income | 50% | 25% | 10% | 5% |

A staff set is assumed to consist of the following:

| Number at National Level | Number per Province | Number per District | Job Title |
|--------------------------|---------------------|---------------------|--|
| 1 | 0 | 0.04 | Epidemiologist |
| 0 | 0 | 0.08 | Statistical Officer |
| 1 | 1 | 0.25 | Data Entry Clerks |
| .25 | 0.25 | 0.0625 | Data Manager |
| .25 | 0.25 | 0.0625 | Administration Officer |
| 0 | 0.25 | 0.0625 | Personnel Secretary/Asst./Receptionist |

All staff are supplied with yearly costs for stationary and office supplies, including computers and printers.

Training for M&E: Three types of training are considered for upgrading the capacity of M&E staff:

- Training of staff on computer usage (e.g., SAS/SPSS): For new epidemiologists hired, and extensive 6 week training course on advanced computer usage and M&E systems.
- Yearly Training of M&E Staff: 5 days of IT training plus 5 days of M&E systems changes to keep all staff current with changing systems.

Strengthening planning and administration for M&E: The following activities are considered, included in countries where they are assumed to be needed:

| Included in countries where the percentage of provinces/districts requiring staff are greater than: | Event: | Costs Include: |
|---|--|---|
| 25% | National M&E mapping and stakeholders assessment | 1 in first and second years; includes <i>National Level Meetings and Reviews</i> . |
| 10% | Targets setting workshop (3 days) | Needed all years; includes <i>National Level Meetings and Reviews</i> . |
| 20% | Formation and meeting of experts' committee | 1 in all years; includes <i>National Level Meetings and Reviews</i> . |
| 30% | Develop M&E Plan | 1 in first year; includes costs of meetings, <i>Development of technical materials</i> , 4 consultant days for instrument adaptation, and <i>Production and distribution of printed</i> |

| | | |
|--------------------------------|--|---|
| | | <i>materials (10 per district).</i> |
| 25% | Workshops for M&E Plan | 8 per year; costs of travel and per diems for staff from every district. |
| (if new M&E plan is developed) | Print M&E Plan | Printing and distribution including distribution to health centres and hospitals; first year only. |
| 25% | Quarterly Meetings | 4 per year; costs includes travel and per diems for provincial and district level staff. |
| 25% | Quarterly M&E reports | 4 per year. Printing and distribution including distribution to health centres and hospitals |
| 20% | Supervision Visits | Monthly visits to all levels (including health centre and community); yearly. |
| 30% | Development of a computer program & IT model to link reporting forms | First year; 30 international consultant days |
| 30% | IT support | Yearly, 60 consultant days |
| 50% | Situational Assessment | 1 in First year only; costs includes travel and per diems for provincial and district level staff. |
| 25% | Support for data analysis | 40 consultant days per year (20 for training). |
| 30% | Additional technical assistance on data triangulation | Needed in first 2 years, with further TA after 4 years; costs assumed to be \$100,000 per year for in-country help. |
| 30% | Development of policy messages and use of data | Yearly costs includes 2 <i>National Level Meetings and Reviews.</i> |
| 50% | Dissemination of findings | Yearly costs includes <i>Development of technical materials, Workshops (8 per year; costs of travel and per diems for staff from every district), and Production and distribution of printed materials (10 per district).</i> |
| 49% | Vehicle | One per province, distributed |

| | | |
|--|---------------------|--|
| | | over 3 years |
| (included if vehicles are included) | Vehicle Maintenance | 20% of purchase price plus assumed fuel usage. |
| 49% | Motorcycle | One per district, distributed over 3 years |
| (included if motorcycles are included) | Vehicle Maintenance | 20% of purchase price plus assumed fuel usage. |

Supporting and enhancing use and implementation of surveys and studies: Estimates of costs of implementing HIV/AIDS specific M&E components to existing surveys, or strengthening the implementation of HIV/AIDS specific measurement tools. The cost is based on the following assumptions:

1. For each country facing a generalised epidemic, the calculation of support costs for PBSs - population based surveys (includes DHS and AIS) – is as follows (based on Kenya):
 - a. \$50,000 base cost
 - b. \$50,000 overall cost for every million population
 - c. allocate one third of this cost to HIV / AIDS
 - d. add \$10,000 for every million population to account for DHS+ (HIV testing)
 - e. divide all by 5 to reach an annual cost
2. for the average country facing a concentrated epidemic, assume support costs for BSS - Behavioural Surveillance Surveys - is:
 - a. two high-risk group classifications in the country
 - b. surveys conducted in two centres for each group
 - c. \$100,000 per survey – i.e., overall cost of \$400,000
 - d. Divide all by 2 to reach an annual cost.
3. For all countries except those projected to have less than 250 ART patients (and with low HIV prevalence), SAM – Service Availability Mapping – is:
 - a. Average cost of \$100,000 per country
 - b. Divided by 2 to reach an annual cost.

Operational Research

Number of Studies: The number of basic (low cost) operational research studies to be undertaken is based on the assumptions outlined in the following table:

| # ART Patients (Projected 2008) | Number of Study Sites | Facilities per Site | Total Sites Visited |
|------------------------------------|--------------------------|------------------------|---------------------------|
| <300 | 0 | 15 | - |
| 300-20,000 | 3 | 15 | 45 |
| 20,000-100,000 | 5 | 15 | 75 |
| >100,000 | 11 | 15 | 165 |

Study sites consist of health facilities delivering ART care or other sites/institutions which provide support to people taking ART therapy. In addition, the same number of studies are assumed to be needed for preventive activities in countries where average coverage of preventive is under 50% (measured as the average coverage of outreach to commercial sex workers [high risk group], STI clinics [medical intervention] and the use of condoms in casual sex [general population coverage]). In areas where preventive activities already have greater than 50% coverage, the need for operational research is considered lower and the need is assessed at 50% of the above number of studies. Low cost studies are assumed to be short-term, cross-sectional surveys or similar activities.

Additionally, medium cost research (such as short-term cohort studies) are assumed to be needed. The number of medium cost studies are assumed to be 10% of the number of short term studies needed, while the cost for these studies are assumed to be 10 times greater than the low cost studies. These studies are assessed for both treatment and prevention, in line with the low cost studies.

Finally, countries with over 250 patients are assumed to need high cost studies on a periodic basis. High costs studies include, for example, randomly controlled trials (RCTs), before-and-after studies, and surgical studies (for treatment). The number needed assumed to be 10% of the number of study sites listed in the table above, and they are assumed to have 50 times the cost of a short term study. These studies are assessed for both treatment and prevention, in line with the low cost studies.

Preparation: Preparation is assumed to be needed every 3 years. Activities included in the preparation for operation research are:

- Stakeholder Review and Priority Setting (*National Level Meetings and Reviews and Development of technical materials*).
- Production & Distribution of plan (*Production and distribution of printed materials (1 per district)*).
- Instrument Adaptation (4 days consultant time).
- Training (1 staff for every 4 sites, 3 days training with teacher costs counted as consultant days).

Operational Costs: Include the following activities:

- Surveys (2 staff for each site for 3 days)
- Additional to the usual costs for surveys, staff are assumed to receive honorarium for their work.
- Staff costs for case studies, focus groups, etc. (Scaled from 0 to 2 FTE based on number of sites; costs include stationary and office supplies and travel expenses).

Follow up costs: Include the following activities:

- Data analysis
- Workshops
- Production and distribution of OR results

- Inter-country cooperation (attendance at regional workshops by one staff from each site for 4 days)

Training for Treatment and Care

Number of new students: The number of new students is based on the number of new facilities needed to incorporate scale-up numbers see assumptions under *Upgrading Laboratory and Infrastructure Capacity*). Class loads are considered separately for health centres and hospitals, summarized in the following tables.

Training Costs (Health Centre):

| Training Module: | Length (days) | Size of Class | Attending Staff per clinic | Attrition |
|---|----------------------|----------------------|-----------------------------------|------------------|
| RN/Aid | 10 | 15 | 1 | 15% |
| Clinical/Medical Officer | 10 | 15 | Mobile (see below) | 30% |
| Lay Counsellor (PLHA or other) (on clinical team) | 11 | 15 | 2 | 10% |
| Supply Manager/Pharmacy assistant/facility manager: | 6 | 15 | 0.5 | 5% |
| Data Clerk/Triage manager | 5 | 15 | 1 | 10% |
| Community Health Workers (community based) | 14 | 15 | 5 | 10% |

With mobile clinical officers determined in the following chart:

| | | | | | |
|------------|------------|---------------|-------|-------|-------|
| Prevalence | Class | Low income | | | |
| | Low-Income | 100% | 100% | 100% | 100% |
| | | Middle Income | | | |
| | CMH Class | CM H 1 | CMH 2 | CMH 3 | CMH 4 |
| | V Low | 80% | 75% | 50% | 33% |
| | Low | 95% | 95% | 80% | 60% |
| | Medium | 95% | 95% | 95% | 95% |
| | High | 100% | 100% | 100% | 100% |

In this chart, a value of 75% means 3 out of 4 district hospitals require a mobile officer, with other districts having an officer at each health centre. This reflects the need for countries where AIDS is a large burden on the health system to perform tasks (e.g., nurses or medical technicians will have a greater responsibility in delivering ART) shifts in order to meet the high demand.

Training Costs (Hospital):

| Training Module: | Length (days) | Size of Class | Attending Staff per clinic | Attrition |
|---|----------------------|----------------------|-----------------------------------|------------------|
| RN/Aid | 10 | 15 | 2+3 | 15% |
| Lay Counsellor (PLHA or other) (on clinical team) | 11 | 15 | 3+2 | 10% |
| Manager | 6 | 15 | 1 | 5% |
| Pharmacist/pharmacy assistant | 6 | 15 | 1 | 5% |
| Lab/lab assistant | 6 | 15 | 4 | 5% |
| Medical Officer | 10 | 15 | 2 | 30% |

Costs include per diems, travel expenses, 2 day follow-up training and exchange between teams, quality assurance each year after initial training, training materials, and costs for trainers. Based on anticipated class load, training and hiring of trainers is considered to accommodate the maximum load. In addition, honorariums for Community Outreach Workers and Counsellors at health centres is included as 1/3 of the minimum wage in a country.

Training of newly hired staff in logistics and drug supply at district/provincial level (as opposed to facility based staff listed above) is considered based on a seven day class, while all drivers receive 3 days training. Similarly, staff hired for patient tracking and monitoring /HIS receive seven days of training.

Clinical Mentoring: It is additionally assumed that health districts that are newly offering ART will need clinical mentoring from a medical officer with standing experience delivering ART. It is assumed that a mentor will visit clinics every month for the first six months, followed by one visit every 2.5 months thereafter (each visit 3 days) and hold team meetings. External monitors are assumed to be needed in countries with less than 5,000 patients. Costs include per diems, travel costs, mentor's salaries (calculated at the 1.5 x FTE for mentors across districts). In addition, air time for cellular phones is included. Additionally, mentor review meetings for all mentors are held twice a year for monitoring and feedback. Costs for training mentors is included as a 10 day training. Finally, all mentors are given 2 hours of air time per week on cellular phones.

Training for Management: 5 days training, with assumed attrition of 20% for programmatic staff. Costed as above.

Increasing the Capacity of Logistics and Supply Systems

New Staffing Needs: The number of staff needed is based on the following tables:

| Number ART Patients: | Multiplier | Health System Strength: | Multiplier |
|----------------------|------------|-------------------------|------------|
| >100 000 | 1 | 1 | 1 |
| 50 – 100 000 | 0.75 | 2 | 0.5 |
| 1000-50 000 | 0.5 | 3 | 0.2 |
| <1000 | 0.1 | 4 | 0.1 |

The criteria of a country are multiplied together, such that a country with over 100 000 patients and a strong health system is assumed to have a need multiplier of 0.1 (1 * 0.1).

Staff includes logistic officers and drivers in every province, multiplied by the results from the table above. In large countries (Argentina, Bangladesh, Brazil, China, Democratic Republic of the Congo, Russian Federation, India, Indonesia, Nigeria, South Africa, Sudan), this is assumed to be per third administrative level. For each driver a vehicle is purchased. Additionally, every area that needs a logistics officer is assumed to need an upgrade to fuel storage capacity. All logistic officers are supplied with yearly costs for stationary and office supplies, including computers and printers.

Storage upgrades: Based on the projected storage space to serve the number of patients on ART and then doubled to accommodate other supplies (laboratory supplies, condoms, etc.) at national and provincial level. Costs include those for basic construction plus 10% for burglar proofing, 20% for insulation, 20% for shelving, and US\$40 per square meter for climate control. 15% of construction costs is assumed for maintenance and utility per year thereafter.

Additionally, cold rooms are assumed to be needed for the storage of 2nd line drugs (1 per nation and 1 per province, with national cold room costing \$20,193 and provincial cold room costing \$13,846; with costs for backup generator (\$9420 with \$970 yearly maintenance and \$2060 yearly running costs), yearly maintenance costs (\$539), yearly running costs (\$2,651), thermo-recorder (\$1373, with \$35 yearly maintenance costs), dial thermometers (\$41), and voltage stabilizer (\$500) for each. These are multiplied by the health system strength multiplier listed above to account for current capacity.

Finally, refrigerators (\$868, \$45 yearly maintenance, \$39 yearly running costs) are assumed to be needed at every hospital and health centre, with back up generators.

Planning and Administration: Includes the following activities.

- Logistic Supervision/Monitoring & Evaluation (5 days travel to each province each month, 3 days to each district each month, and 2 days to each health centre each month).
- Situation analysis (7 consultant days).

- Procurement and Supply Management Plan (*Development of technical materials, and Production and distribution of printed materials.*)

IT upgrades of storage facilities: 1 set for each new health centre covered (see *Upgrading Laboratory and Infrastructure Capacity*) covered, including costs of computer and peripherals (including UPS, virus protection, etc), and establishing and maintaining e-mail connectivity (establishing connectivity costs from US\$4000 to US\$12000 per site depending on income-level, with maintenance of connectivity assumed to be 20% of this per year).

Stock control: Stock cards are supplied every month to provinces and districts.

Technical consultations: Assessed as 0.5% of yearly costs.

Upgrading Laboratory and Infrastructure Capacity

Determining number of health centres and hospitals: Based on the number of projected patients, the following assumptions are made. Half of patients entering from TB clinics and antenatal care and all from hospital inpatient wards are assumed to receive treatment at hospitals, with the remainder receiving ART from health centres. The incremental number of patients is then used to determine the number of new hospitals and health centres needed each year, assuming each hospital can serve as a focal point for **4000** patients (10 health centres) and each health centre can treat **400** patients.

The percentage of hospitals and health centres needing upgrading is based on the following table:

| Income Class | Health Infrastructure Quartile | | | |
|---------------------|--------------------------------|-----|-----|-----|
| | 1 | 2 | 3 | 4 |
| Low-income | 100% | 75% | 50% | 25% |
| Low-Middle Income | 75% | 50% | 25% | 10% |
| Upper-Middle Income | 50% | 25% | 10% | 5% |

The equipment needed for each upgrade is summarized in the following table:

| Item | Needed at Health Centres | Needed at Hospitals |
|---|--------------------------|---------------------|
| Added space & rehabilitation | 1 | 1 |
| Balance Beam Scales | 1 | 1 |
| Microscopes | 1 | 1 |
| CD4 Machines | 0 | 1 |
| Card Machines | 1 | 1 |
| Viral Load Machines | 0 | .25 |
| Coulter Counter | 0 | 1 |
| Biochemistry Machines | 0 | 1 |
| ELISA Reader & equipment | 0 | 1 |
| Mobile Phone (<i>including operating costs</i>) | 1 | 0 |

Development and Building of New Health Facilities:

I. Determining number of health centres needing construction: Two approaches are used:

1. Recommended: Based on the assumption that one health centre will, on average, provide ART services to no more than 400 patients, the number of patients that could not be served by the current or estimated current level of health facilities in a country were calculated. Then, new health centres were built for every 400 of the additional patients needed. This approach represents the best estimate of the need for health facilities based on the assumption that there is more need for human resources than there is for site construction—that is, that many of the currently existing health centres are under- or un-staffed, and new staff hires or trainees will serve in these existing structures

II. Cost assumptions:

While in some cases health centres will be needed sooner based on these assumptions, it was further assumed that it would take 4 years for a new health centre to be completed. That is, the first year is dedicated to situational analysis to determine what areas of the country will potentially need more health centres, combine the plan with human resource plans, and otherwise prepare a national framework for health centre expansion. The first and second years involve actual site assessment and selection, and purchase of land, paperwork, architectural design, permits, and contracting. From there, it is assumed that a health centre will be built in, on average, 1.5 years. The cost assumptions follow:

- Situational Assessment: Costs include travel and per diems for provincial and district level staff.
- Site selection and assessment: 5 consultant days.
- Land Purchase (legal and financial fees): 5% of construction costs.
- Paperwork/architectural design: 10 consultant days.

-Permits: 4.5% of construction costs.

-Contracting: 10.5% of construction costs.

-Construction: Based on the following space allocation assumptions, the average health centre was assumed to be 128.5 square meters. A further 20% is added onto the price for site works, and then a further 20% for furnishings and equipment. The price per square meter is taken as the average cost between a district and provincial city.

Average Specs for health centre:⁵

1. 4 rooms (one each for a medical officer, for a nurse, for 2 counsellors) at one room per 15 sqm each
2. 1 staff toilet, 2 public toilets (m and f) at 2.25 sq m
3. storage room for drugs and patient cards 9 sq m
4. laboratory/other room 5 sq meters
5. waiting lecture/triage room 54 sq m
6. resting bay with 3 beds; 40 sq m

Note that construction costs for facilities finished in year 4 incur costs in year 3 in this model. No maintenance costs are included since no facilities are completed in the time frame of the analysis. Upgrades for laboratories, including store of reagents, desk, and a secure place to keep waste are considered under upgrades for laboratories.

Supervision for Treatment and Care

Determining number of health centres and hospitals needing supervision: Is determined based on the assumptions outlined in the section on *Upgrading Laboratory and Infrastructure Capacity*.

Costs for supervision: Is based on the following table.

⁵ WPRO. District Health Facilities: Guidelines for development and operations, 1998 and Hopkinson M and Kostermans K. Building for Health Care: a guide for planners and architects of first and second level facilities. World Bank (Eastern and Southern Africa Human Development Group) 1996.

| Supervision, quality assurance, and support on all levels | | |
|--|--------------------------------|-------------------|
| | Number of Supervisors per trip | Visits per year |
| Health Centres | 2 | 6 (12 first year) |
| Hospitals | 3 | 6 |
| Payment Support to Mobile Medical Officers | 1 | 26 |
| Laboratories | 1 | 4 |
| Pharmacies | 1 | 4 |
| Community Groups (<i>assumed to be 3 times the number of health centres</i>) | 1 | 4 |

Additionally, the number of supervisors and their salaries are calculated, based on 25 weeks available per year for supervision. However, salaries for supervisors to community care groups is described below. The number of Mobile Medical officers is based on the calculations described under *Training*.

CHW Supervisors: additional annual FTEs per district network newly offering ART, based on the following chart:

| | GDP | Low income | | | | Middle income | | | |
|------------|-----------|------------|-------|-------|-------|---------------|-------|-------|-------|
| | CMH Class | CMH 1 | CMH 2 | CMH 3 | CMH 4 | CMH 1 | CMH 2 | CMH 3 | CMH 4 |
| Prevalence | V Low | 50% | 50% | 25% | 25% | 25% | 25% | 25% | 25% |
| | Low | 50% | 50% | 25% | 25% | 50% | 50% | 25% | 25% |
| | Medium | 100% | 100% | 50% | 50% | 100% | 100% | 50% | 50% |
| | High | 100% | 100% | 50% | 50% | 100% | 100% | 50% | 50% |

(The above chart indicates the average FTEs per district - so in a high prevalence country CMH4, one member of staff for every four hospitals).

All staff are supplied with yearly costs for stationary and office supplies, including computers and printers.

Patient monitoring and tracking system: additional FTE programme management staff per country, based on the following chart:

| | | | | | |
|--------------------|------------------|-------|-------|-------|-------|
| Number of Patients | CMH Class | CMH 1 | CMH 2 | CMH 3 | CMH 4 |
| | <500 | 0% | 0% | 0% | 0% |
| | 500 to 5,000 | 100% | 100% | 50% | 50% |
| | 5,000 to 100,000 | 200% | 150% | 100% | 100% |
| | > 100,000 | 200% | 200% | 200% | 150% |

Note that the assumed numbers include fractions of full time staff; this is seen as devoting the human resources (either existing or newly hired) to HIV/AIDS activities, while the remainder of the FTE will work on other disease areas.

With staff consisting of the following types:

| Number (per region) | Type |
|-----------------------------------|--------------------------|
| 1 (per country) | Programme Manager: |
| 2 (national) | Epidemiologist |
| 1 (province) | Health Information Staff |
| 0.5 (province) | IT |
| 0.75 (districts) | Health Information Staff |
| 0.75 (districts) | Support staff |
| 1 per epidemiologist, 0.5 per HIS | Vehicles |

Such that the number of staff is multiplied by the percentage need from the upper table. For example, a country with over 100,000 patients, and classified as low income with a CMH ranking of 1, will need 2 programme managers at the national level, 4 epidemiologist at national level, etc.

Additionally, it is assumed that 1 data clerk is needed in hospitals for every 1,000 ART patients.

All staff are supplied with yearly costs for stationary and office supplies. Computer and peripherals are assumed to be needed as 1 at national level, 1 per province, and, in lower-middle or richer countries, 1 per district. Yearly maintenance and gas usage for vehicles is included.

Staff at hospitals is assumed to need 5 days of training for patient tracking. The entire clinical staff, as outlined in training above, is assumed to need training excepting the lab technician. Hospitals that are newly delivering ART also are assumed to receive training. All programme level staff (as outlined above) also receive training. Attrition is assumed to be 20% in low and lower-middle income countries in Africa and selected other low-income countries. Elsewhere, attrition is assumed to be 7%.

After training, supportive supervision is supplied. National and provincial staff (each taking half of total supervision visits) visits the hospital every month in the first year (National staff travel costs in large countries are counted as airfare). Trips are 1 day each

plus travel time. After the first year, hospitals receive quarterly supervision visits from district staff.

Every hospital receives two registers (for identified HIV positive patients not yet on ART, and for patients who have started ART) yearly, at a cost of \$50 each. Every patient receives a patient tracking card every year (\$0.125). Reporting forms are also supplied for every facility (4 fold carbon copy sheets, \$0.22 each) each month.

HIV Drug Resistance Prevention and Assessment

National Level Drug Resistance Working Group/Committee: One committee meeting every month, with 1 national meeting annually. Committee meeting consists of 5 to 15 people (based on projected number of patients, varying by year) for 0.5 days. The national meeting is for 2 days for 30 to 50 people (based on projected number of patients, varying by year).

Hiring National HIVDR coordinator: One staff (1 FTE)

Surveillance of transmitted drug resistance: 2 new sentinel geographic areas (cities or metropolitan areas, or rural districts or provinces) in countries not currently undertaking drug surveillance in 2006. In large countries (population in need of ART equal to or greater than 100,000), up to 10 additional areas surveyed by 2013 (linear scale-up). Surveys are generally performed at more than one site in each area where HIV diagnostic testing is performed: antenatal clinics, STD clinics, or voluntary counselling and testing centres are generally suitable sites. Each area performs 1 survey per year, at a cost of US\$100,000 (the bulk of these costs are tradable products). The costs for surveillance are assumed to decline (due to improvements in technology) linearly, starting in the fourth year, to \$50,000 in year 2015.

Sentinel monitoring of drug resistance emerging during ART: 2 new sentinel antiretroviral treatment sites in all countries in 2006. This will increase to 10 sites by 2010 in all countries with over 250 patients. In countries in Africa with more than a very low prevalence rate, this number is doubled to account for NGO or other non-governmental sites carrying out ART therapy. In Asian countries with more than a very low prevalence, similarly, the base number of sites is multiplied by 1.5. In countries with more than 100,000 patients in need for ART, 1 additional site is considered for every 50,000 patients over 100,000. Each site carries out 1 study per year, at a cost of US\$200,000 (the bulk of these costs are tradable products). Starting in 2008, these costs are assumed to decline (due to improvements in technology) in a linear fashion to \$100,000 in 2015.

Development of Database: Cost of computer (1st year, with maintenance and connectivity for following years and replacement every 5 years) and training (assumed to be

US\$15,000 in international setting). Additionally, a 0.5 FTE technician is dedicated to the updating and maintenance of the database.

Technical Assistance: US\$50,000 to \$100,000 is assumed for each country, based on the projected number of patients. This is doubled in the first 5 years of drug surveillance to account for initial learning.

No costs are included for this activity for countries projected to have less than 250 ART patients by the end of 2015.

WHO has a genotyping laboratory accreditation process and a sufficient number of accredited regional laboratories will be able to provide genotyping for HIVDR surveillance and monitoring in countries scaling up ART through 2015. Funding to establish new laboratories is a low priority compared with more basic HIV laboratory needs and with HIVDR prevention and assessment activities, and is therefore excluded from the model.

Training and retaining health workers

Costs for Pre-service Training: For pre-service training, estimates of the number of additional health workers to train are based on the FTE numbers of health workers required to treat the additional AIDS patients. This was done for 60 countries⁶.

Health worker shortages exist in most countries now while training new personnel takes some years. It is, therefore, assumed that new staff can be recruited in the short run either from other countries, or encouraged to return to the health sector from other activities. This leaves us with two scenarios for pre-service training. In the first, the additional staff hired while new health workers are being trained stay in the system, so replacements do not have to be trained (called additional). In the second, they are assumed to leave once local workers are trained, so replacements also have to be trained (called total).

Costs for Retaining Health Workers: Two Scenarios were explored - salaries would need to be doubled, or increased five fold, to retain health professionals. Using multiples of salaries is intended as a convenient method of expressing the amount that might be needed to retain health workers. The resulting figures do not have to take the form of salary increases but can also be paid out as benefits, allowances, etc. This increase was

⁶ Adam T, Tan Torres Edejer T, Gutierrez JP, Bertozzi S, Stover J, Greener R, Evans DB, Evans TG. Valuing the health worker in the fight against AIDS: the costs of the "treat, train and retain" strategy. Submitted for publication.

applied to all staff working with HIV/AIDS, including doctors, nurses and midwives, as well as pharmacy and laboratory technicians.

Thus, in total, four scenarios for training and retaining health workers are considered.
