Inventorying Data, Tools, Guidance, and Range of Use for HIV Costing & Technical Efficiency Analysis: *First Steps*

As HIV & AIDS programs have matured, the costs and cost effectiveness of these programs have been extensively studied. Donor and domestic funding has also increased considerably over the last decade, but there is little coordination among donors and recipients on consistent guidelines and tools for costing interventions and using results. In its last meeting, the Technical Working Group (TWG) on Costing & Technical Efficiency agreed to play a role in filling this gap by helping to document and analyze data and methods and making costing results more relevant to the needs of policymakers.

This pre-read for the meeting of the TWG in Seattle on November 6-7, 2014 is meant to stimulate a discussion on concrete next steps for inventorying existing costing standards and tools and reviewing how their application has been used to improve policy and programming. Such an inventory should document HIV costing and efficiency guidelines, tools, and studies under a meaningful organizing framework that helps planners and researchers to consistently:

- Source data for costing instruments (models)
- Use appropriate guidelines for their analyses
- Identify any deficiencies in data and methods
- Map the use of results in policy and planning for understanding impact

Once launched, the inventory should help in better focusing costing and efficiency exercises by systematically highlighting gaps, uses, and impact.

This initial selection of tools, guidelines, and studies is an illustrative exercise in organizing costing resources and their application for various purposes. It is not meant to be a systematic or exhaustive collection of materials, or a finalized framework for organizing them. As an attempt to begin to collect and organize costing work, it should, however, serve to elicit thoughts from members on possibly initiating and organizing such a process. The following illustrative collection of selected resources is organized in the following way:

- Data and methods:
  - Databases for costing and efficiency analysis
  - Models for estimating intervention or program costs
  - Guidelines or standards on collecting and using data and leveraging models
- Application of these data and methods in:
  - Retrospective studies and meta-studies for
    - Estimating unit costs as inputs for projecting resource needs and discussing policy and coverage options
    - Analyzing programs for efficiency improvements
    - Possibly, accountability for donor and domestic commitments (where empirical analyses incorporate expenditure tracking)
  - Prospective studies and meta-studies for
    - National or global level resource needs estimation for advocacy around financing gaps (e.g. normative projections of needs)
    - Routine program or national budgeting (e.g. empirical costing)

The systematic application of an improved or similar framework for documenting costing and efficiency analyses for the standards and tools employed should help to identify the gaps and inconsistencies in data, methods, and uses of such work.

Data and Methods

Databases

Title	**Unit Cost Repository**
Organization	Futures Institute
Source	http://policytools.futuresinstitute.org/UC/Default.aspx
Aim	Support the costing of national strategies, Global Fund applications, program sustainability, economic evaluations
Methodology	Organized by intervention, population, country/region, sector, type of unit cost
Data source(s)	Drawn from keyword search of published literature since 1990 available through PubMed, POPLINE, HIV InSite, and Google
Costs	37 intervention categories; 4 regions; 43 countries
Strengths	Detailed information on over 150 studies on HIV treatment and prevention interventions in developing countries; includes quality scores for studies; separates out economic and financial unit costs by labs, drugs, personnel, overheads, and capital goods
Geography	150 lower and middle income countries
Caveats	Units costs reported in studies taken as given, with assumptions to facilitate comparison
Contribution	A centralized source of intervention costing data for planners and researchers

HIV & AIDS Tools/Models for Resource Estimation

Title	**AIDS Impact Model**
Source	USAID, Spectrum System of Policy Models
Aim	Project number of future HIV infections, AIDS cases, and AIDS deaths, given assumptions about adult HIV prevalence, as well as the demographic and social impacts of HIV; provides basis for policy dialogue and advocacy by considering impact through scenario analysis.
Methodology	Modifies demographic projections for use from DemiProj, another Spectrum suite model. The *treatment costs* section of the package uses data on HIV infections, AIDS cases, and AIDS deaths from the *epidemiology section* to project costs of treatment for PMTCT, HIV, and HIV-related TB infections and OIs.
Data source(s)	Demographic projections from DemiProj; recorded/academic data and assumptions about the past and future course of adult HIV incidence and treatment coverage
Cost Drivers	Inputs/assumptions about incidence and coverage
Takeaways	Modeled data for use in advocacy and planning (for instance, capacity strengthening in Mali)
Geography	General (global as well as national; for instance, use in UNAIDS projections, policy dialogue in Mali)
Scope / care model	Financial package focused on treatment costs
Gaps	Does not utilize primary data; and does not cover a wider scope of program costs
Contribution	Used by UNAIDS (along with the estimation and projection package) for producing biennial national and regional estimates

Title	*AIDS Resource Needs Model*
Source	Futures Institute (updated; 2006)
Aim	Aid to national-level strategic planning
Methodology	Ingredients-based sub-models on prevention, treatment, and mitigation require definition of population target groups, unit costs, and coverage/access targets. Other program-level costs (policy, management and administration, research, and M&E) can be estimated as shares (e.g. 5% of program value for M&E) or in absolute terms.
Data source(s)	Contains default values for many of the variables used by the model derived from information obtained from published studies on the cost of prevention and care programs. This information can be used or replaced with locally available data; also requires national data on the population size and distribution, adult HIV and STI prevalence, and sexual behavior.
Cost Drivers	Coverage targets and unit costs
Takeaways	Resource for advocacy and resource mobilization; not for retrospective cost analysis
Geography	General; national-level
Scope / care model	Calculates the total resources needed for prevention, care, and orphan and vulnerable children support for HIV/AIDS on a national level. Enables resource needs estimation for comprehensive sub-models on prevention, care and treatment, and mitigation.
Gaps	Suitable as a projection aid but not for retrospective analysis; takes unit costs as given
Contribution	Broad scope / tool for comprehensive resource needs estimation for strategic planning and advocacy
Title	*HIV/AIDS Program Sustainability Analysis Tool (HAPSAT)*
Source	Health Systems 20/20, USAID (2007, 2011)
Aim	Enable countries to estimate program resource needs for planning and advocacy around financing gaps for making domestic programs more sustainable by discussing priorities, efficiency, and effectiveness with stakeholders. Includes an Excel-based tool to estimate scenario-based gaps in funding and human resources.
Methodology	Ingredients-based scenario analysis and cost comparison
Data source(s)	External
Cost Drivers	Unit costs and coverage targets
Takeaways	Resource for advocacy and resource mobilization; not for retrospective cost analysis
Geography	General; national-level
Scope / care model	Set and cost targets for any HIV/AIDS interventions
Gaps	Suitable as a projection aid but not for retrospective analysis; takes unit costs as given
Contribution	Had been used in 14 countries by 2012 to inform strategic planning (e.g. successful Global Fund application in Zambia; increased public budget commitment in Nigeria, etc)

Title	*USAID Goals Model*
Source	(USAID, Spectrum)
Aim	Designed to enhance strategic planning by showing how the amount and allocation of funding are related to the achievement of national goals on prevalence and coverage for treatment, care, and support.
Methodology	Simulates an HIV epidemic by estimating the number of new HIV infections occurring in various population risk groups; estimates "need for treatment" given modes and rates of transmission and levels of prevention interventions; combines with unit cost of treatment to achieve total resource needs.
Data source(s)	External sources of unit costs and assumptions about transmission
Cost Drivers	Need for treatment, coverage rates, and unit costs
Takeaways	Useful for projections and scenario analysis but not retrospective or empirical costing
Geography	General/National level
Scope / care model	Comprehensive
Gaps	Suitable as a projection aid but not for retrospective analysis; takes unit costs as given
Contribution	Tool for combining information on costs and evidence of program impact and relating these to trends in the national HIV situation; tool for analyzing impact/effectiveness of resource needs scenarios

Costing Guidelines

Title	*Cost Effectiveness Analysis and HIV/AIDS*
Authors/Org	UNAIDS, 1998
Aim	Introduces cost effectiveness as a tool for HIV program managers and planners to measure and compare costs and impact of various interventions, assess relative efficiency, and estimate future resource requirements.
Methodology	Presents short and general descriptions of components of cost effectiveness analysis and provides overviews of challenges- designing/defining an intervention, identifying and measuring (direct, indirect, and intangible) costs, identifying a suitable and measureable indicator of impact to assess effectiveness. Illustrates with examples of previous country costing studies.
Data source(s)	Recorded data maintained by managers on activity costs; patient/student records; and special studies for 'societal' costs- reliance on previous provider level expenditure information.
Cost Drivers	Care and associated activities
Takeaways	Importance of cost effectiveness analysis for managers, and explanation of basic principles
Geography	General
Scope / care model	Unspecified- mentions direct, indirect, and intangible costs all as important to cover
Gaps	No actual step-by-step costing manual or data collection tables. Refers to the 1994 PHC Manual as a key resource for effectiveness but does not actually adapt it for use in HIV programs. Overall, too general and short (12 pages). Does not explicitly disaggregate by the type of HIV services; uses examples to for various types of interventions though. Reliance on provider-level expenditure information for current and future costing.
Contribution	Beginning discussion / initial guidance on cost effectiveness in HIV/AIDS programs
Title	*Costing Guidelines for HIV Prevention Strategies*
Authors/Org	UNAIDS, 2000
Aim	Enable HIV projects managers to assess the cost and cost effectiveness of providing different HIV prevention strategies (blood screening, mass media, education in schools, condom social marketing, treatment of STDs, peer education for sex workers, VCT, prevention among IDUs, PMTCT)
Methodology	Relate to and adapt the methodology presented in an earlier manual called "Cost Analysis in Primary Health Care—a training manual for programme managers" (PHC Manual, WHO 1994); uses capital and recurrent costs and total costs of activities as inputs for costing each strategy.
Data source(s)	Provides templates (summary sheet and forms A-D) for noting costs by project, level, and input; and for documenting outputs
Cost Drivers	NA
Takeaways	Estimation of unit costs from collection of primary financial data to calculate cost of prevention strategy
Geography	General
Scope / care model	Costs of various prevention strategies at the project levels
Gaps	Focuses primarily on provider and financial costs
Contribution	Compared to the 1998 guidelines, this documents adds cost analysis worksheets and includes IDUs. It enables systematic cost effectiveness and efficiency analysis through estimation of unit (average) costs for planning and (bottom-up or top-down) budgeting

Title	Costing Guidelines for HIV/AIDS Intervention Strategies
Authors/Org	Asian Development Bank, UNAIDS, Futures Group International and Ease International - 2004
Aim	For use in estimating resource needs, scaling-up, and strategic planning in the Asia/Pacific region.
Methodology	Provides the scheme for Rapid Costing Assessments (RCAs) using intervention modules from INPUT spreadsheet for generating local unit costs for strategic considerations and planning. Resource needs to be estimated for specific sub-populations based on defined interventions and population size targets. Impact of targets on prevalence can then be estimated using GOALS.
Data source(s)	Market prices and procurement and salaries information used as inputs; RCA through INPUT; impact assessment through GOALS model; RNM for comparing additional data
Cost Drivers	Accounts for five key elements: behavior change communication; delivery of commodities and services for prevention (sex workers, IDUs, STI/VCT clinics for mobile populations, MSM, youth) and care (VCT, MTCT, palliative, OI treatment and prophylaxis, TB, HAART); enabling environment at project level; program management; project M&E
Takeaways	Estimate economic costs > derive unit costs > calculate program costs based on coverage targets
Geography	General, although the manual refers to Asia Pacific region
Scope / care model	Design and costing of prevention intervention packages for key sub-populations or delivering care services (ART/PMTCT, etc).
Gaps	Does not include integrated cost estimated for activities like HIV policy, capacity-building, advocacy, mass awareness programs, blood safety, national surveillance, and monitoring and evaluation etc. Provides a worksheet to compare the national costs of these with regional and global figures provided as defaults in the Resource Needs Model.
Contribution	Estimate unit costs and resource needs for operational plans for population-linked targets and interventions, following formation of country strategic plans. More broad-reaching (country-level resource needs); incorporates impact analysis to help with allocative efficiency concerns; national-level financial gap analysis to help with resource mobilization
Title	Manual for costing HIV facilities and services
Authors/Org	UNAIDS, 2011
Aim	Costing of HIV prevention, treatment, care, and support services at the facility and programmatic levels
Methodology	The manual understands facility as a service site divided into service centers and connected to other facilities in a service chain, with complementary service chains forming a program, and several programs forming a healthcare system. It allows for facility and program costing through aggregating current cost of (care) service centers (including support service costs) offering personal services over a one-year period. Calculating unit and total costs within a facility involves direct cost of providing the service, plus the cost of support provided within the same facility and the cost of support provided through other sites within the program. A bottom-up/ingredients based approach using cost and prices of inputs (current financial price) recommended for use as often as possible.
Data source(s)	Inputs, prices, and outputs obtained from: routinely collected information (recorded data obtained retrospectively or prospectively); collection of costing-specific data; expert opinion on what occurs. The manual includes, as a companion document, a "Workbook on collection of cost information" with detailed notes and forms for collecting data.
Cost Drivers	Level of personal care services (output) delivered
Takeaways	Same costing principles and data requirements for program, service chains, service sites, and (care and support) service centers
Geography	General
Scope / care model	Comprehensive

Gaps	The guidelines allow for costing direct and indirect personal care, and ancillary and site management services support services at the facility level. Support from subnational and national levels can also be similarly costed to allow for costing entire service chains making up a program. There is risk of double counting. Also, the scope of support services may be too broad when it comes to support services such as orphan care, social services, HIV research. The guidelines are not clearly developed in these areas beyond facility-level care and support.
Contribution	A change in costing approach to a facility-level, service-oriented perspective. Fairly comprehensive; builds up to the cost of a national program from costing and aggregating service chains, sites (facility), and centers (within facility); a much more formal, cost accounting-oriented method. Reflects recommendations on facility costing from the 2006 WHO workshop "Essential Information for Countries to Monitor & Evaluate the Economic Aspects of HIV Service Provision: proceedings from a workshop "
Title	*(Protocol for) Facility-Based Unit Costing for Antiretroviral Treatment in Five Sub-Saharan African Countries*
Authors/Org	CHAI, 2011 (with BMGF support)
Aim	Estimation and comparison of care and treatment (pre-ART and ART) costs for resource mobilization, efficiency, and effectiveness
Methodology	Standardized top-down/empirical analysis of total yearly costs for treatment in 2011 in 30 (public/NGO/FBO) facilities in Ethiopia, Malawi, Rwanda, South Africa, and Zambia. Comprehensive cost data to be collected for one year, allocated proportionally to selected patient types, and then divided by the number of patient years for the same one year timeframe to arrive at cost per patient per year for each patient type.
Data source(s)	Retrospective program records and other facility documentation to get direct and indirect running costs for facilities (drugs, labs, personnel, and other), and investment and overheads expenditure/costs. Closely aligned in general methodology to that utilized by PEPFAR for its ART costing work.
Cost Drivers	Service delivery areas pre-identified to be studied as important cost drivers: ARVs, clinical care, laboratory services, supply chain management, outreach programs (e.g. adherence, retention), training, M&E and HMIS, facility administration and management, and (above facility) high level administration and management.
Takeaways	Incorporate quality and complexity in cost analysis and comparison
Geography	30 facilities; 5 SSA countries (Ethiopia, Malawi, Rwanda, South Africa, and Zambia)
Scope / care model	Facility level pre-ART and ART costs; limited empirical costing
Gaps	A "protocol" for a specific study and not an original manual. Given method and data limitations (empirical spending analysis), the exercise is not intended to provide final conclusions on the drivers, efficiency, and effectiveness of costs. The study design is focused on facility-level analysis and does not follow patient cohorts over time; limited ability to assess the longer-term impact of different policy choices and service delivery models on patient outcomes.
Contribution	Aims to describe and explain cross/intra country variation in cost per quality-adjusted person-year of ART, so incorporates quality and complexity in cost and cost effectiveness analysis.

Application

Meta-studies

Retrospective

Title	**Unit Costs for Delivery of ART and PMTCT: A Systematic Review for Low and Middle Income Countries (LMICs)**
Authors	(Galárraga, Wirtz et al. 2011)
Aim	Review of studies on delivery unit costs for adult and pediatric ART/patient-year, and PMTCT/mother-infant pair in LMICs, to inform program planning and budgeting, and improving efficiency
Methodology	Systematic lit review and a meta-analysis (aggregation and sensitivity analysis) of per-patient unit expenditures on adult and pediatric ART as well as ARV prophylaxis used for PMTCT, using explicit guidelines for review, and standardizing data from eligible studies into common service delivery units and cost component categories
Data source(s)	29 full-text analyses with country-specific, empirical measurement of actual expenditures on ARVs, labs, and personnel from micro-costing or ingredients approach. Publications and data collection between 01/2001-10/2009.
Cost Drivers	ARV drugs largest component of overall ART cost in LIC, LMIC and UMIC; then labs in LIC/LMIC and personnel in UMIC; followed by personnel in LIC/LMIC and labs in UMIC.
Takeaways	Paucity of data on the full ART and PMTCT delivery unit costs (especially for LMICs); differing activities and cost components hamper standardization; international guidance on standardized costing methods, and expenditure categories and definitions needed for program-level unit costs; large variations in unit costs for similar income and epidemiological contexts
Geography	Studies considered limited (55%) mainly to Sub-Saharan Africa (50% in South Africa)
Scope / care model	Considered only costs from treatment-related basic program activities from 29 analyses of program costs
Gaps	Only economic costs from provider perspective; lack of regional representation; doesn't comment on quality of studies
Contribution	Updated unit cost numbers and conducted a quantitative meta review compared to previous reviews of unit costs
Title	**Costing of HIV interventions: What are the critical gaps?**
Authors	Willyanne DeCormier Plosky and Lori Bollinger (2013) [May 2013 TWG meeting]; Futures Institute
Aim	Provide update on gaps in published costing studies; ascertain availability of costing information on critical social and program enablers; discuss limitations in quality of published unit cost data
Methodology	Literature search of prevention, treatment, and care studies between 1990-2013; unit costs for the database drawn from primary data from published literature; quality review for prevention studies
Data source(s)	Primary unit cost data from literature available through PubMed, POPLINE, HIV InSite, and Google
Cost Drivers	– –
Takeaways	Future research needs include regional diversity [Francophone and Lusophone SSA, Central Asia, E. Europe, LAC (particularly the Caribbean), and MENA]; IDU, women and girls (education, preventing GBV, post-rape), human rights, disabled, prisoners; and info on intervention costs over time, economies of scale, patient costs, costs above the facility level, and cost bundling.
Geography	159 studies: 71% SSA; 19% Asia; 8% LAC; 2.6% Eastern Europe, Central Asia, & MENA
Scope / care model	Studies considered varied between interventions covering all or some of basic program activities, critical enablers, and development synergies; Intervention types distinguished by population covered

Gaps	Possible that some studies not captured by keyword search; full search of grey literature not conducted; numbers of actual interventions considered (≠ number of countries or studies) may have been underestimated due to methodology
Contribution	Takeaways for information base on unit cost data for interventions, particularly for countries other than South Africa and India
Title	***Is there scope for cost savings and efficiency gains in HIV services? A systematic review of the evidence from low- and middle-income countries.***
Authors	(Siapka, Remme et al. 2014); LSHTM, UNAIDS
Aim	Synthesize available data on costs, efficiency, and economies of scale and scope, for the six basic programmes of the UNAIDS Strategic Investment Framework, to inform the scale-up of HIV services in LMICs
Methodology	Search, analysis, and systematic review of relevant peer-reviewed and "grey" literature from LMICs under Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines and Drummond's checklist for quality check. Used the unit costs of service provision at the health-provider level as primary comparative statistic.
Data source(s)	Keyword search on PubMed and Eldis databases and the Cochrane library, and manual searches of important web sites for English-language studies between 1990-2013 with primary cost data. 82 empirical costing and efficiency studies identified.
Cost Drivers	Scale was often found to explain statistically significant proportions of the variability seen in unit costs: as a programme ages, unit costs may either increase, or – if the programme scales up over time – decrease because of task-shifting and learning by doing
Takeaways	Scale explained much of the variation in the costs of several HIV services, particularly those of targeted HIV prevention for key populations and HIV testing and treatment. There is some evidence of economies of scope from integrating HIV counselling and testing services with several other services. Cost efficiency may also be improved by reducing input prices, task shifting and improving client adherence.
Geography	Sub-Saharan Africa, Asia and Pacific (India), Eastern Europe and Central Asia, LAC, MENA (1)
Scope / care model	6 programmatic activities of UNAIDS' Strategic Investment Framework: ART; VCT; "key-population" programs; condom distribution and social marketing; voluntary medical male circumcision; elimination of HIV infections among children keeping mothers alive; and behavior-change communication
Gaps	Limited evidence of possible gains from targeting specific groups of patients and clients and little examination of the trade-off between the costs of targeting and efficiency gains; also no studies found in which the cost efficiency of providing more intense services to a particular group was compared with that of providing a minimal service to a larger population group.
Contribution	A wider scope of programmatic activities considered (summaries of mean unit costs from selected studies in each program area provided)

Title	*How Much Does It Cost to Provide Antiretroviral Therapy for HIV/AIDS in Africa?*
Authors	(Rosen and Long 2010); Boston University
Aim	Three years into a sharp scale-up of expanded ART delivery in Sub-Saharan Africa, the study attempts to locate empirical information on the cost of delivering ART for HIV/AIDS for program planning and budgeting and to depart from the earlier reliance on modeled costs
Methodology	Review of published literature, gray literature, and conference abstracts to locate empirical estimates of the costs of providing ART in service delivery (non-research/trial) settings in sub-Saharan Africa- 17 studies found; 10 from South Africa, to compare cost per patient per year
Data source(s)	Studies with primary, retrospective data on resources actually expended for a treated population and studies with modeled resource estimates (from expected treatment regimens and schedules of services or from local clinical trial populations) that used primary local data for input prices; searched on Medline, the Social Science Citation Index, Google, and abstracts of conference (e.g. last six International AIDS Society, etc)
Cost Drivers	ARV drugs; higher cost of non-ARV inputs in South Africa
Takeaways	ARV medications a large proportion of the total cost per patient, but this proportion varies widely; extreme dearth of high quality cost data on ART for HIV/AIDS
Geography	Sub-Saharan Africa; with 10 studies from just South Africa
Scope / care model	Cost of ARVs and laboratory tests; some estimates reviewed also included treatment of opportunistic infections (mostly excluding TB), inpatient care, personnel (staffing) for outpatient care, and infrastructure. Some studies reviewed also accounted for the cost of program management.
Gaps	Small number of studies available for review; cost estimates included were drawn from a range of verified and unverified sources of variable quality; possibility of overestimating the 2006 cost of ART (many studies reviewed provided data from before 2003-2006, when ART prices fell sharply); inconsistency in costing methodologies of studies, likely due to lack of attention to economic aspects of programs
Contribution	An early attempt at collecting empirical costs of service delivery; highlights the need for imminently generating cost information from a wide range of countries and settings

Title	*How should HIV programmes respond to evidence for the benefits of earlier treatment initiation? A combined analysis of twelve mathematical models*
Authors	(Eaton, Menzies et al. 2013); WHO, BMGF
Aim	Assess health impact, cost, and cost-effectiveness of expanding adult ART eligibility under new WHO guidelines (CD4 cell count ≤ 500 cells/µL,)
Methodology	Compared costs at the health system level from twelve independently developed mathematical HIV epidemic models for South Africa (7), Zambia (4), India (3), and Vietnam (1); calculated the incremental $/DALY averted to compare competing strategies: very cost effective if $/DALY < gross GDP/capita. [Models: Goals, STDSIM, EMOD, BBH, PopART, Synthesis, Menzies, Macha, Pruddell, Mishra, IDU-Manipur, Prevtool]
Data source(s)	UNAIDS country-level epidemiological estimates; CHAI and IHME info on ART programmes in South Africa and Zambia; CDC and USAID input on ARV supply chain management costs; CHAI and CDC-Division of Global HIV/AIDS unpublished cost estimates.
Cost Drivers	Strategies that expand access to all HIV+ adults are much more costly than those that only change eligibility
Takeaways	Expanding treatment coverage in the general population in generalized epidemics (South Africa and Zambia) and to key populations in concentrated epidemics (India and Vietnam) were both found to be cost effective. Countries could prioritize the strategy that has the lowest cost per DALY averted (e.g. expanding eligibility than covering all HIV+ adults in generalized epidemics)
Geography	South Africa, Zambia, India, and Vietnam
Scope / care model	Simulate transmission at the population level, disease progression, and incorporate reduced morbidity, mortality, and infectiousness
Gaps	Factors contributing to variation in model results include different fundamental representations of the underlying epidemiology of HIV transmission and different expectations about future patterns of treatment uptake and effectiveness. Also, work needs to be done to compare model predictions with observational data.
Contribution	Use of several models identifies conclusions that are robustly reproduced across the models; imp given the wide range of results demonstrated in previous analyses

Select studies

Retrospective studies

Title	**The cost of providing comprehensive HIV treatment in PEPFAR-supported programs (2011)**
Authors	(Menzies, Berruti et al. 2011); CDC, ICF-Macro, USAID
Aim	The study reports empirical data on costs and cost trends in a large sample of HIV treatment sites.
Methodology	Economic and financial cost analyses in 2006-7 at 43 PEPFAR-supported outpatient clinics providing free comprehensive HIV treatment in Botswana, Ethiopia, Nigeria, Uganda, and Vietnam.
Data source(s)	Data collected on HIV treatment costs over consecutive 6-month periods starting from scale-up of dedicated HIV treatment services at each site.
Cost Drivers	Recurrent costs consistently the highest; ART costs and the package of services.
Takeaways	Median annual economic costs per patient in 2009 USD; treatment costs vary widely between sites and countries, and high early costs drop rapidly as sites mature.
Geography	Botswana, Ethiopia, Nigeria, Uganda, and Vietnam.
Scope / care model	Programmatic perspective; considers all site-level costs of outpatient ART and supportive care for all patients. Outcomes: cost/patient & total program costs, subdivided by major cost categories.
Gaps	Cost reductions may allow near-term program growth, but programs need evidence to weigh the trade-off between improving services for current patients and expanding coverage to new patients.
Contribution	Targeted at supporting PEPFAR, national governments, and other stakeholders in investing resources to provide HIV treatment in developing countries.
Title	**Factors influencing global antiretroviral procurement prices (2009)**
Authors	(Wirtz, Forsythe et al. 2009); INSP and Futures Institute
Aim	Analyze global ARV prices between 2005 and 2008 and associated factors like procurement methods and key donor policies on ARV procurement efficiency; discuss options related to programming ARV procurement
Methodology	ARV-medicines price-analysis using WHO's Global Price Reporting Mechanism. Regression analysis of global median prices and price variation for a selection of 12 ARVs to identify factors associated with lower procurement prices, and to identify characteristics of countries which procure below the highest and lowest direct manufactured costs.
Data source(s)	ARV transaction prices from the Global Price Reporting Mechanism
Cost Drivers	ARV prices variation associated with whether the drug was generic or not; the socioeconomic status of the country; whether the country was a member of CHAI.
Takeaways	Prevalence, procurement volume, PEPFAR-focus status, and LDC status did not affect prices
Geography	92 GPRM-reporting countries (LIC/LMIC/UMIC/HIC)
Scope / care model	Adult ARVs
Gaps	Pediatric formulations not considered; substantial variation because of factors not included
Contribution	Investigates determinants of ARV prices, which are important cost drivers in HIV programs

Title	*The Determinants of HIV Treatment Costs in Resource Limited Settings (2012)*
Authors	(Menzies, Berruti et al. 2012); CDC, ICF-Macro, HSPH
Aim	Determinants of annualized per patient cost of service delivery, excluding ART
Methodology	Data on HIV treatment costs collected from 54 from PEPFAR clinical sites in Botswana, Ethiopia, Mozambique, Nigeria, Uganda, and Vietnam, to investigate relationships between site characteristics and per-patient costs, excluding ARV expenses.
Data source(s)	Utilizes a secondary dataset of HIV treatment costs (from a comprehensive provider perspective) collected from 54 HIV treatment sites across Botswana, Ethiopia, Nigeria, Uganda and Vietnam, and Mozambique as part of two previous studies utilizing the same methods.
Cost Drivers	Patient volume (no. patients receiving treatment) and site maturity (months since clinic began providing treatment services) were both strong independent predictors of per-patient costs
Takeaways	Substantial reductions in per-patient service delivery costs occur as sites mature and patient cohorts increase in size. Other predictors (price levels, clinical follow-up, laboratory monitoring, and clinician-patient ratio) suggest possible strategies to reduce per-patient costs.
Geography	Botswana, Ethiopia, Mozambique, Nigeria, Uganda, and Vietnam
Scope / care model	Comprehensive treatment costs at the facility level (costs of personnel, drugs and other clinical supplies, laboratory supplies, other supplies, travel, utilities and building costs, training and supervision, equipment, and renovation/construction; these included cost of regular technical assistance supervision, M&E, and management support to the site)
Gaps	Outcome does not capture the quality of care or extent of the health benefits enjoyed by patients receiving that care.
Contribution	Provides an empirical basis for estimating future resource needs for supporting HIV treatment programs in the future, allowing analysts to begin to specify cost functions that are sensitive to program scale, maturity, and other operating characteristics

Prospective studies

Title	*AIDS2031: Critical Choices In Financing the Response to the Global HIV/AIDS Pandemic (2009)*
Authors	(Hecht, Bollinger et al. 2009); R4D, Futures Institute, Georgetown University
Aim	Presents findings from the AIDS 2031 Costs and Financing Working Group to answer, among other questions: what are the global resource needs for AIDS through 2031, and what factors will be critical in driving costs up or down?
Methodology	Followed the UNAIDS framework Global Resource Needs Estimates with some modifications; incorporated target population sizes, unit costs, and coverage through 2031, considered new interventions that may become available. Resource needs for LMICs: population in need × coverage × unit cost
Data source(s)	Sources for target population groups varied by intervention; unit costs were based on data from published sources and adjusted for PPP; unit costs for some interventions were projected to change for scale; four scale-up scenarios were constructed to represent financial and epidemiological results of different policy choices.
Cost Drivers	Key drivers are the cost of ARVs for treatment, and appropriate allocation between interventions for prevention
Takeaways	Resource needs estimated between US$19 billion and US$35 billion annually by 2031. Significant savings are possible with appropriate re-allocation, while achieving nearly the same prevention impact; new technology innovations like treatment leading to a cure or an AIDS vaccine could be game changers
Geography	20 countries with the most new infections (plus Brazil & Mexico for representativeness) analyzed

Scope / care model	Broad: based on UNAIDS Global RNEs, including resources required for 19 prevention interventions, 7 care and treatment interventions, OVC support, and 15 program support functions
Gaps	Inability to account for possible synergistic interactions among variables; scope not accounted for in unit costs for all interventions
Contribution	Answering some key questions on costs and financing for global programming over the two decades until 2031
Title	*The Long Run Costs and Financing of HIV/AIDS in South Africa (2010)*
Authors	(Guthrie, Ndlovu et al. 2010); CEGAA and R4D
Aim	Review available literature on unit costs for HIV/AIDS interventions in South Africa and develop a database; estimate the medium and long-term costs of the national response under a series of scenarios; explore scope for efficiencies
Methodology	Merged 4 key methodological approaches: extensive review of available South African unit costs to construct a database, national costing using the Resource Needs Model (RNM) adapted for South Africa; epidemiological modeling using Spectrum calibrated to the South African ASSA estimates; effectiveness analysis using the GOALS model combined with Spectrum to influence the epidemiological outcomes
Data source(s)	Primary source of unit cost data was the costing of the NSP done in 2007 by Cleary et al. (The costs of the National Strategic Plan on HIV and AIDS & STIs 2007-2011). Other costs from regional studies assumed for South Africa and adjusted for 2009 prices
Cost Drivers	Majority of costs (60–70%) come from AIDS treatment efforts, and this high share of spending for treatment is the same under all three scenarios.
Takeaways	Under all scenarios, costs rose very rapidly over 2007/08-2015/16
Geography	South Africa; national
Scope / care model	Scenarios based on NSP interventions: narrow (2011), comprehensive (2021), prioritized by cost effectiveness (2015)
Gaps	Lack of reliable, up-to-date information on AIDS costs, service coverage levels, and cost-effectiveness in the country. There is need for facility- and project-based cost estimates of many of the interventions in South Africa, where unit costs are still unavailable, incomplete, or unreliable.
Contribution	Directed at programming financing for South Africa's national response
Title	*The impact and cost of the 2013 WHO recommendations on eligibility for antiretroviral therapy (2014)*
Authors	(Stover, Gopalappa et al. 2014); Futures Institute, UNAIDS, WHO
Aim	Estimates the number of newly eligible patients for ART if all countries adopt the 2013 WHO treatment guidelines, and shows the cost and impact if coverage expanded to 80% of those eligible
Methodology	Uses the AIDS Impact model and the Goals model for estimates of eligibility, and impact of ART on deaths; projections of costs and AIDS deaths based on estimates for 116 LMICs; projections of impact on HIV incidence based on simulation modelling for 24 high burden countries, with results scaled up to represent all LMICs. Studies effects by comparing two scenarios: coverage from 2010 guidelines achieved by 2015 and remaining constant, and 2013 guidelines.
Data source(s)	Output from AIM model analyses from LMICs coordinated by UNAIDS obtained and aggregated to reach global totals; unit costs per person taken from WHO "Antiretroviral drugs for HIV infection in adults and adolescents: recommendations for a public health approach [2006 revision]" [used $515/patient-year, declining to $445/patient-year by 2025]
Cost Drivers	The largest increases in the eligible population resulted from 3 groups newly eligible under the 2013 guidelines: adults with CD4 count between 350 and 500; pregnant women and serodiscordant couples; and children up to 5 years old

Takeaways	The additional costs of the 2013 guidelines: $1.8 billion in 2015; $3.3 billion in 2020; $1.71 billion by 2025. Costs per infection and death averted from 2013 to 2025 of implementing the 2013 guidelines are $9000 and $9600, and cost per QALY ($350) well below the cost–effectiveness threshold recommended by the Commission on Macroeconomics and Health
Geography	General
Scope / care model	ART treatment
Gaps	High degree of uncertainty associated with population estimates; uncertain country ART treatment data
Contribution	Modeling cost impact of 2013 guidelines
Title	***Total cost and potential cost savings of the national antiretroviral treatment (ART) programme in South Africa 2010 to 2017***
Authors	(Meyer-Rath, Pillay et al. 2010);USAID/PEPFAR, BU, DOH/NT in South Africa's government
Aim	Costing task team convened by the Department of Health to study changes in top line from changing South Africa's guidelines to include increased eligibility, better drugs, changes to drug procurement, and changes to staffing levels and tasks
Methodology	Compare treatment costs from eligibility under South Africa's old and new guidelines and the 2010 WHO guidelines using South Africa's National ART Cost Model; conditioned on presence of new drug purchasing system and task shifting
Data source(s)	Cost data from bottom-up cost analysis at Themba Lethu clinic in 2007-2009 (n=350); ARV cost for children adjusted by age and weight; ARV costs updated to last public tenders; mortality, treatment failure, etc, data used from 2 large Johannesburg cohorts
Cost Drivers	ART and personnel costs; number of new patients
Takeaways	Under both new and WHO 2010 guidelines, increase in cost as a result of increased eligibility and better drugs is dwarfed by the increase in cost resulting from the growth in the population in need of ART, regardless of eligibility criteria; HIV prevalence will continue to be a stronger driver of treatment costs than eligibility thresholds or drug choices; model indicates that the projected increases in treatment cost under both new guidelines could be offset by the introduction of new drug purchasing mechanisms and task-shifting
Geography	South Africa
Scope / care model	ART treatment (1st and 2nd line); pediatric
Gaps	Task shifting and new drug purchasing mechanisms are key conditions for cost comparison conclusions; assumed cost does not differ between CD4 cell counts, and inpatient cost is excluded
Contribution	Importance of task shifting and procurement mechanisms as important sources of cost savings

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