UNAIDS 2025 | GUIDANCE

Practical methods for projecting the costs of national strategic plans for HIV and beyond

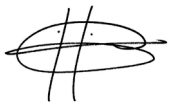
Foreword

As global HIV and health financing faces unprecedented constraints, the need for countries' strategic, evidence-informed planning has never been more critical. Costing national HIV strategic plans (NSPs) is not simply a technical exercise—it is a foundational step in ensuring that countries' multisectoral HIV responses are evidence-informed, equitable, efficient, impactful, and aligned with national priorities. This guide responds to a growing demand for practical, adaptable methods to project the full resource needs of NSPs, offering tools transferable to broader health planning and a YouTube playlist with chapter specific training videos: https://www.youtube.com/playlist?list=PLm24qjjmwsqq9hXI41OcLiM1ZZIla_r4P. The accompanying excel workbook can be downloaded from the UNAIDS financial dashboard: https://hivfinancial.unaids.org/NSP costing workbook.xlsx.

In an era of dramatic declines in donor support and increasing domestic responsibility for the HIV response and broader health, countries must be equipped to make informed decisions about how to allocate limited resources for maximum impact. Costing enables this by translating strategic and implementation plans into the resources needed to implement them and supporting advocacy for sustainable investment, systems and programme implementation. It also fosters transparency, consistency, and accountability across planning cycles.

This guide empowers policymakers and technical teams alike to integrate costing into the heart of strategic planning—ensuring that all money spent advances health equity, strengthens systems, and delivers measurable results. As countries navigate complex health challenges, robust costing is not optional—it is essential.

These guidelines were written through a sequence of reviews by members of the technical advisory committee and feedback from training participants.



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Chapter 1: Introduction

Objectives

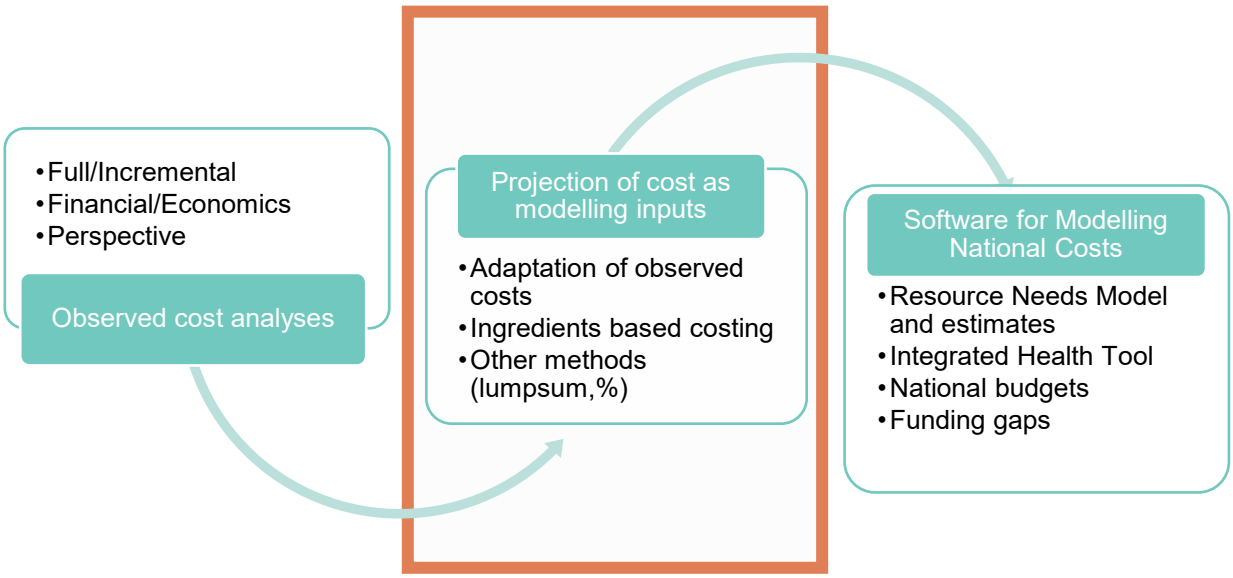
- Explain the motivations for publishing this guide.
- Provide the historical context, and explain the guide's purpose, scope and intended audience.
- Share the vision for how this guide will make it easier to carry out a high-quality costing exercise for a country's multi-sectoral national strategic plan (NSP) for confronting HIV and beyond.
- Identify the people involved, such as the costing team and those responsible for managing NSP development projects.

1.1. Purpose

An NSP is a collaborative document that includes a summary of the country's epidemiological situation, an assessment of the strengths and challenges of the response to date, an articulation of programmatic goals for the next three to five year time period, and a description of planned strategies and actions that are expected to achieve those goals. The cost analysis is a projection of the resource requirements to implement the plan. Creating an NSP to steer a country's HIV response is not easy. The process takes several months, involves a wide range of stakeholders, requires careful analysis, consensus building and decision-making. It draws on disparate data sources and technical expertise in epidemiology, clinical care, intervention design, and delivery, target populations and their communities, health systems, disease modelling and economics.

A recent review of costed HIV NSPs revealed that cost projections were often a weak point, with significant potential for quality improvement *(1)*. Although there is general guidance on how to develop an NSP for HIV *(2–4)*, how to project the resources needed to realize the plan remains a critical gap. In addition, there is currently no clear guidance on how to generate the unit costs that feed into models, tools and platforms, such as the Resource Needs Model (RNM). While the WHO handbook Strategizing Health in the 21st Century provides a valuable chapter on approaches to estimate the cost implications of health sector plans, further methodological resources are needed on how to produce reliable unit costs that go into such estimations *(5).* Integrating HIV plans with broader health sector plans can significantly enhance the effectiveness and reach of health-care services. It ensures that HIV care is planned and budgeted within the overall health system plan and development planning processes. However, there is still a need for HIV NSPs to guide focused investments, and there are currently no specific guidelines on generating estimates of the resource needs of HIV NSPs. Figure 1.1 presents the gap that this guide aims to fill in costing methods. They only address the tasks expected of the costing team, who are one part of the broader set of expertise required to develop a NSP. Chapter 3 presents the configuration of the broader NSP team and the role of the costing team within it.

Figure 1.1. These guidelines focus on addressing the methods gap between primary costing and national cost estimates



This guide addresses this need by:

- Presenting a clear overview of the responsibilities of the costing team(s) over the life of the HIV NSP development.
- Providing a flexible, yet detailed, step by step approach for efficiently carrying out a high-quality costing exercise.
- Identifying a set of quality standards for HIV NSP costing exercises.
- Giving relevant examples of commonly encountered challenges with practical solutions.
- Providing a workbook template that can be used to help organize, track progress, undertake analytical steps and report the results of exercises projecting HIV NSP cost to ensure that quality standards are met.

This guide describes generic methods that can be used with or without specific software. In recognition of globally developed and commonly used tools, the RNM, the OneHealth Tool and its successor, Integrated Health Tool (IHT), will be described and used in examples *(6-8)*. A standalone workbook is provided for both preparing cost inputs for analysis using an existing cost projection model, like IHT or RNM, and/or for estimating total resource needs with the accompanying workbook.

It is hoped that this guide will assist HIV programme planners, decision makers and organizations commissioning costing tasks in conforming to the set of generally accepted methodological standards and reporting requirements to improve consistency and comparability across costing exercises. While it focuses on HIV interventions, the fundamental methods presented are transferable to other disease areas.

The guide is written for the NSP leadership and coordination teams and, especially, the technical staff tasked with the cost analysis component of strategic planning. For the leadership

and coordination teams, the aim is to encourage integration of costing work into the overall planning process so that:

- The costing team has adequate access and time to obtain the information needed from the rest of the strategic planning team and other stakeholders.
- The cost analysis aligns with the rest of the NSP in terms of epidemiological and programmatic assumptions.
- The cost analysis is available early enough in the planning process for its findings to inform strategy development.
- The costing team has a clear understanding of the expected quality and scope of the analysis and deliverables.

This publication provides guidance on preparing value for money evidence to inform priority setting at the start; identifying key areas for improving technical efficiency; preparing input costs for cost projection software; and projecting total resources needed under key scenarios, e.g. from resource needs to achieve country HIV targets, optimizing programming under resource-constrained scenarios. While affordability assessments are key, these require financing landscape analyses, which are not addressed in this guide.

This guide may be particularly helpful in supporting the training and mentoring of new cost the team. The technical staff tasked with the cost analysis may have in-house capacity or may outsource the capacity from a small pool of potential experts (for example, consultants) nationally or internationally. To expand the workforce, NSP costing exercises would ideally be assigned to a team, including a senior economist and an emerging team still gaining experience in cost analysis. The team may include government employees or university-based or project specific consultants.

The vision for this guide is based on four key principles: flexibility; practicality; consistency; and transparency. The aim is to provide guidance that is adaptable to a wide range of situations, considering variations in NSP scope, team organization, stakeholder participation, data availability and modelling software to be used. Additionally, it is recognized that the assignment duration, training and experience of the costing team all influence what can be feasibly accomplished in a cost projection exercise.

It is assumed that the costing team will probably not have easy access to a complete package of detailed, recent, accurate, locally generated cost data. Accordingly, this guide addresses common challenges that they face and offers a range of solutions. Trade-offs are identified that need to be considered when choosing between approaches. The approaches preferred are identified because they are likely to produce higher quality costing results. In addition, practical ‘second-best’ solutions are offered when the preferred approach is not feasible because of data or time constraints.

It is hoped that this guide becomes a trusted resource for teams tasked with costing of NSPs, providing a systematic approach to efficiently project the total resource requirements needed to carry out NSP activities and interventions (sometimes referred to as an NSP budget or a resource needs estimate) and other cost related analyses essential for strategic planning. It outlines what constitutes a high-quality cost analysis and provides techniques for overcoming commonly encountered problems, such as interventions that are vaguely described, or a lack of applicable unit cost data. The guide includes various templates and tools that are general enough to be widely applied and tailored to most strategic planning costing exercises.

Nevertheless, it is expected that the costing team has a good understanding of Excel and will be able to critically apply and adapt formulas as appropriate to their specific task.

1.2. What does it mean to cost an NSP?

An NSP for HIV is a comprehensive framework developed by countries to guide their response to the HIV epidemic over a defined period. It sets out priorities, targets and strategic actions necessary to achieve national HIV prevention, testing, treatment and care goals, aligned with global targets. The NSP typically includes detailed strategies for ensuring access and uptake of services by people living with HIV and those at risk, including key and other vulnerable populations, scaling up interventions, strengthening health and community systems, and addressing social and structural barriers to accessing HIV and other relevant services and that drive the epidemic. It is a foundational tool for coordinating resources, aligning stakeholders, and monitoring progress *(9, 10)*. An effective NSP reflects a country's specific HIV context, using evidence-based approaches to maximize impact while fostering sustainability and resilience in the national response.

In this guide, 'costing an NSP' refers to projecting the resource needs for these strategies and interventions—typically encompassing the costs of service delivery, drugs and medical supplies, required personnel and other essential elements of implementing the NSP for HIV. For example, if the NSP sets a target to test 80% of a specific key population within a year, this guide will demonstrate how to calculate the cost per person and project that cost to meet the 80% coverage goal. It is important to distinguish this from an operational budget, which typically focuses on activity-based costs, detailing specific meetings, training sessions and administrative tasks necessary to support NSP implementation. While these activities should be included in the NSP costing, they are part of the broader exercise of estimating costs for health focused strategies and interventions.

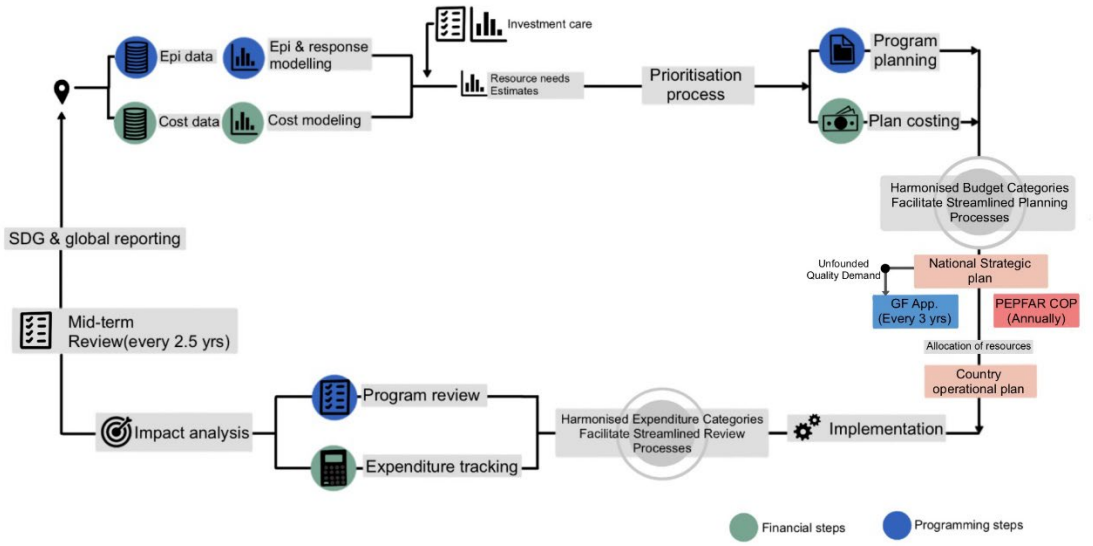
1.3. How does the NSP fit into the planning and review cycle?

Strategic planning and programme monitoring activities follow a cyclical pattern. Ideally, the cycle begins with an investment case (IC) showing how an investment in the HIV response can return health and other benefits and cost savings over a long-time horizon. The IC would inform an NSP, which is more focused on the scale-up of specific interventions over a medium-length time horizon of three to five years to make progress towards long term goals. For countries that receive funds from the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), grant allocations occur on a three-year cycle, and the NSP should be the basis for the funding requests (FRs) submitted to the Global Fund. The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) bilateral aid programme has been another major funder in many countries. PEPFAR has been planning its activities annually and since recently, as a two-year planning cycle through a Country Operating Plan (COP) for PEPFAR-supported countries and subregions. As the global health infrastructure changes, governments may change this planning cycle to best suit their needs.

Complementing these strategic planning activities is a set of monitoring and evaluation (M&E) activities used to measure progress (Figure 1.2), and where routine resource tracking is important for monitoring whether budget implementation (expenditure) is according to the planned/ estimated resources needed. A mid-term review of NSP implementation verifies if programmes and expenditures are on track with the plan and enables mitigating actions for situations, where the programme is off track, or where the situation has changed significantly.

Both the Global Fund and PEPFAR engage in ongoing expenditure tracking and have harmonized the categories of expenditure tracked to facilitate combining data on expenditure from multiple funders. The Global Fund conducts performance monitoring and reviews with each grant cycle. UNAIDS supports countries that wish to conduct a National AIDS Spending Assessment (NASA). In addition to measuring expenditures on HIV programmes, NASA exercises usually map funding flows from sources to interventions and beneficiary groups. Additionally, countries report their progress annually to the Global AIDS Monitoring (GAM) system, which includes financial indicators to track progress in resource allocation and utilization, without which the NSP targets could not be met.

Figure 1.2. A coordinated HIV national planning and review cycle



The costing team should understand where the NSP fits into the larger domain of HIV programme planning and monitoring efforts. Information generated at each step of this process can be useful for the NSP costing exercise. Previous planning activities likely include cost projections that the team should review to determine the applicability of data, assumptions and methods for the current NSP costing exercise. In addition, any expenditure tracking and analysis can provide valuable reference points to compare with inputs to the NSP costing in a validation triangulation exercise.

1.4. Brief history of strategic planning for a national HIV response: Increasing focus on cost and efficiency

UNAIDS issued its first guidelines for strategic planning in 1998 *(2)*. Since then, most low and middle-income countries (LMICs) with a significant HIV disease burden have developed NSPs for HIV, also called national strategic frameworks, for their HIV response. Typically, NSPs cover a three-to-five-year time horizon and articulate the outcomes that the response aims to achieve and an evidenced-based prioritization of programmatic actions that is aligned with the epidemic situation.

The overarching goal of an HIV NSP is to provide a comprehensive and integrated framework of policies, strategies and interventions to guide the development, organization and delivery of HIV services. The NSP will outline a medium-term vision and specific goals and objectives for improving health outcomes and addressing ongoing and contextual challenges. The NSP Steering Team is responsible for guiding the process of the NSP development, ensuring each

Technical Working Group (TWG) follows a common vision and aligns with a set of guiding principles.

The first generation of NSPs covering the early 2000s often did not include cost analysis or resource needs estimation. However, costing and resource allocation planning received more attention as funding of HIV programmes rapidly increased with the establishment PEPFAR and the Global Fund, the World Bank's Multi-Country AIDS programme, bilateral contributions from many high-income countries and increased domestic resource mobilization.

Around the years 2009–2011, as HIV programmes gained scale and maturity, UNAIDS focused more on country ownership, including shared financial responsibility and increasing domestic resource mobilization, which further increased the need for high quality strategic planning and an accurate understanding of resource requirements and efficiency. This need has only increased as donor funding for HIV programmes has flattened since 2008 *(11)*.

The Global Fund has required costed NSPs for many years as part of its funding application process. As part of its effort to simplify its grant-making process and align with national planning cycles and national priorities, it seeks to enable the country NSP to serve as the foundation of the countries' Global Fund application in the so-called 'tailored to NSP' approach.

Today, when countries embark on strategic planning for HIV, it is expected that: (1) cost-effectiveness evidence is used in priority setting at the outset; (2) cost analysis is undertaken and resource need is summarized in NSP total projected costs; and (3) accurate cost information is used to examine the efficiency of proposed resource allocation to ensure no money is wasted in pursuit of the stated strategic goals, and alternatives more efficient programming approaches are considered.

Given the growing importance of including cost projection exercises as part of NSP development and well-known challenges that often limit the quality of costing exercises, including the availability of financial and programmatic data, insufficient integration of the costing exercise with other aspects of NSP development process, inconsistency in analytical methods, and poor documentation *(12)*, it is important to produce a practical methodological guide. This can be used as a resource to support managers leading NSP development projects and the technical staff carrying out the costing exercises and projecting total NSP resource needs.

1.5. How does the HIV NSP costing guide align with other HIV and health intervention costing guidance?

The term 'costing' has many interpretations which can cause confusion to a team looking for methodological guidance. It can refer to what researchers do in rigorous scientific studies, collecting primary data from a representative sample to measure the resources used and the economic or financial cost of producing various health interventions. Some organizations have managerial cost accounting systems that enable another type of cost analysis, such as activity-based costing, in which resources used by the organization are allocated to the different types of activities that form the services they produce. Organizations might use this type of cost analysis to improve the efficiency of production processes or make pricing decisions. Developing a budget for how an organization will use resources also involves cost analysis. The exercise of making a cost projection—i.e. an estimation of the resources that will be required to carry out some future activities—is another type of cost analysis which is this guide's principal concern

In the context of a national HIV response, a typical costing exercise for strategic planning involves making high-level projections of the approximate cost of all resources needed in each of several years in the future to implement interventions and other strategic actions to achieve strategic goals. It is usually broken down by HIV interventions within strategic priority areas. Total costs are computed primarily by multiplying expected intervention output quantity (e.g. person-year of antiretroviral therapy (ART)) by a unit cost, also called average costs. The quantity of intervention output is based on a forecast of how much of that intervention is required to achieve a strategic goal, such as a certain level of population coverage or a certain impact on disease burden. Preferably, unit cost values will be informed by previously conducted intervention specific primary costing studies, activity-based cost estimates, or unit expenditures. The estimates obtained from these secondary sources will need to be adapted to fit the strategic planning context. When there is a lack of primary costing data, the team may construct a unit cost using the ingredients-based costing (IBC) method.

Box 1.1. Defining the NSP costing exercise

What it is

A type of costing analysis in which a projection of monetary resource requirements is made for a future time-period over which an HIV programme will operate, based on a set of assumptions about the scale at which many different HIV interventions will be delivered during that time. Usually, this is accomplished by estimating a mean unit cost per unit of intervention output and multiplying this by the quantity of intervention output units required to meet various strategic goals or by starting from activities or ingredients to project full resource needs into the future. The estimates of input costs for the interventions are obtained by gathering and synthesizing available evidence on intervention cost from primary costing studies and other data sources, such as descriptions of intervention protocols and routine expenditure reports, or input prices such as salaries, drug prices, etc.

What it is not

The NSP costing exercise is not primary economic research aimed at estimating the unit cost of delivering an intervention in an actual programmatic context, where a sample of data is collected and analyzed. NSP costing exercises do not address the need for primary costing studies that seek to estimate retrospectively what it cost to do something, or time-driven, activity-based costing and management (ABC/M), which similarly tries to estimate the cost of things based on data from observed implementation.

This guide complements several related resources which provide methods for costing HIV programmes (see the section on costing in Ref. *(13)*).

The Global Health Cost Consortium (GHCC) has a reference case for reporting the results of primary costing studies *(14)*. Several books cover the process and methodology for primary research estimating the cost of medical and public health interventions. Journal articles address specific topics such as how to adjust prior cost estimates for inflation *(15)*. There are also method guides for utilizing specific software such as the One Health Tool and its successor, the Integrated Health Tool (IHT), as well as Spectrum-Goals, the Resource Needs Model and Optima to model health programme impact and cost. However, none of the existing resources specifically addresses the full process of conducting a costing exercise for an HIV NSP (see Appendix 1 for an overview of reviewed costing guidelines and their scope).

In an NSP costing, the costing team's main task, after generating value for money estimates for the NSP planning team, is to gather and apply information from existing primary costing research studies and other data sources to generate estimates of the average cost to produce a unit of intervention output in the future that has been adapted to the NSP context. In addition, the team may cost societal enabling activities or infrastructure that cannot easily be measured

in quantities of service delivery output. Some NSP cost analyses may also be responsible for aligning with the broader health sector planning and costing work for the sector-wide NHSP. Methodological guidance specifically and comprehensively addressing these types of costing tasks are needed during NSP development.

This guide stands out from prior work in three key aspects:

- **Scope:** It aims to bridge the gap between the guidelines focusing on primary cost analysis and exercises projecting the resource needs of a forward-looking plan. It covers the full range of HIV interventions, including direct health services, indirect programme support activities, and initiatives targeting societal and structural enablers. Furthermore, these guidelines offer the flexibility to adapt to emerging programmes, interventions and other health areas.
- **Methodology:** It focuses on methods for adapting existing unit cost estimates from primary costing studies and generating ingredients-based unit cost estimates for use as inputs in NSP resource projections, providing multiple approaches for addressing common challenges that occur when information is scarce or inconsistent.
- **Applicability:** It can be used in a wide range of cost projection exercises, including those using computer software to model policy scenarios such as the RNM and the IHT for planning and costing *(6, 8)*.

1.6. Making cost projections: Science and art

The quality of cost projections varies widely and their use in policy decision-making is often undermined for several reasons, including short timetables for conducting these costing exercises, lack of standard methods, poor coordination resulting in redundant or overlapping efforts, relegation of the costing exercise to the very last stage of the strategic planning process, and poor documentation resulting in past exercises being of limited value to subsequent ones. When these issues lead to a lack of timely, credible resource needs estimates, it undermines resource mobilization efforts and diminishes the potential to strategically allocate resources for maximal impact. As a result, the HIV programmes may remain underfunded and achieve less impact than they potentially could, leading to more people acquiring HIV and more people dying prematurely due to AIDS.

Rarely can a single unit cost value be obtained from the primary costing literature or a curated resource of unit costs (e.g. the Global Health Costing Consortium Unit Cost Study Repository *(16)* and directly used (exactly as it has been reported) by the costing team as an input for the current NSP, without some adjustment. The data from primary costing research will necessarily be from a different time period, and may be from a different setting, or based on a different service delivery approach. The costing team will need to systematically evaluate the relevance of that literature derived estimate and possibly make several adjustments to adapt the unit cost for the current NSP context. A review of primary costing research may reveal multiple unit cost estimates of variable quality and applicability to consider. Or there may be no unit cost estimate at all (e.g. when the intervention is new and not yet implemented, so primary research measuring observed cost has not been done).

Uncritically applying an existing unit cost estimate from the literature with no adjustments and no documentation is likely to undermine the credibility of the costing exercise's results. Instead, in-depth analysis is required to evaluate the current range of reported unit costs (both for the country where the exercise is being conducted and for relevant neighbouring countries) and

understand what drives the differences in their values. This guide covers methods for tasks such as synthesizing multiple estimates, adapting estimates from other settings, adjusting costs to account for omissions in the scope of inputs measured, and updating estimates to reflect either inflation, real price changes or changes in service delivery modalities. Tools and examples for documenting this work are also provided.

Costing teams commissioned to carry out NSP costings should be well-versed in these methods and have the skills and experience to make methodological recommendations appropriate to the context. However, making a prediction of the cost of a forward-looking plan is also, to some extent, an 'art' that requires judgements that are likely to improve with experience. Nonetheless, the range of approaches and their appropriateness in a particular context can be codified and taught.

In many cases, the 'art' of NSP costing involves making informed assumptions to overcome data limitations or uncertainty about the future. The range of possible solutions to a data limitation will often depend on the availability of proxy data, the time and budget available for the costing work, and the level of precision required to address the decisions that the NSP is aiming to inform. To ensure its practicality, the challenges experienced during the conduct of NSP costings in several countries have been observed and documented *(9)*. The guide includes a range of approaches for dealing with these challenges, as well as guidance on how to choose an approach. Consistent with this guide's best practices and recommendations, methodological standards and reporting requirements are proposed that could be routinely incorporated into a term of reference for costing teams or outsourced consultants to encourage methodological consistency and comprehensive reporting of methods, data sources and assumptions used in NSP costing exercises (see Appendix 5).

This guide contains specific methods for projecting costs for actions that come out of the HIV strategic planning and prioritization exercise. It is a practical resource for cost the team, with approaches for dealing consistently with data gaps and other challenges that are illustrated with real 'case study' examples. It is not intended to replace academic textbooks or to apply to primary research studying intervention cost or conducting economic evaluation. It instead aims to provide practical information, flexible tools and companion resources that give a costing team a viable approach for carrying out a high quality NSP costing exercise.

1.7. A note on terminology

In this guide, the item being costed as an intervention refers to a set of activities designed to achieve a specific output or outcome. Activities refers to the tasks or actions carried out as part of an intervention. Programme refers to a coordinated set of interventions aimed at achieving a common goal. Table 1.1 presents an example of the hierarchy of interventions and activities in the programme area of HIV testing.

Table 1.1. Programmes, interventions and activities hierarchy

Programme	Intervention	Activities
HIV testing service	Provider-initiated testing and counselling	Pre-test counselling
		Testing
		Post-test counselling
		Training sessions

	Community-based HIV testing and counselling	Demand generation
		Pre-test counselling
		Testing
		Post-test counselling
	HIV self-testing	Demand generation
		Pre-test counselling
		Test distribution
		Optional post-test counselling

There are a few reasons that this is important. Firstly, if you are adapting a cost, you need to make sure that the intervention with the original costs being applied is comparable to the planned intervention, i.e., includes the same activities. Secondly, if you need to build up costs from scratch, then you may end up using the activities as a basis for your ingredient-based costing.

The term intervention may not be the most intuitive description for some of the actions included in an NSP. Some interventions in an NSP might better be described as policy changes, infrastructure investments, or support functions. For example, an NSP might prioritize changing regulations for medication dispensing to enable changes to care delivery aimed at improving quality—a policy change. An NSP might include a plan for expanding laboratory infrastructure—investing in new buildings and equipment—so that laboratory services are closer to the point of care for more patients and their providers. An NSP might include actions for increasing community input into the HIV response. While all components of an NSP may not most naturally be described as interventions, this term will be used in this guide for consistency.

1.8. Structure of the guide

This guide provides a structured, step by step approach for cost the team and NSP project managers to conduct a high-quality costing exercise for a national HIV response. Organized into 11 chapters that follow the chronological structure of an NSP costing exercise (Figure 1.2), the guide offers a blend of foundational principles, practical steps and flexible tools. An accompanying workbook with adaptable templates supports each stage of the costing process, enhancing consistency, quality and efficiency (Table 1.2).

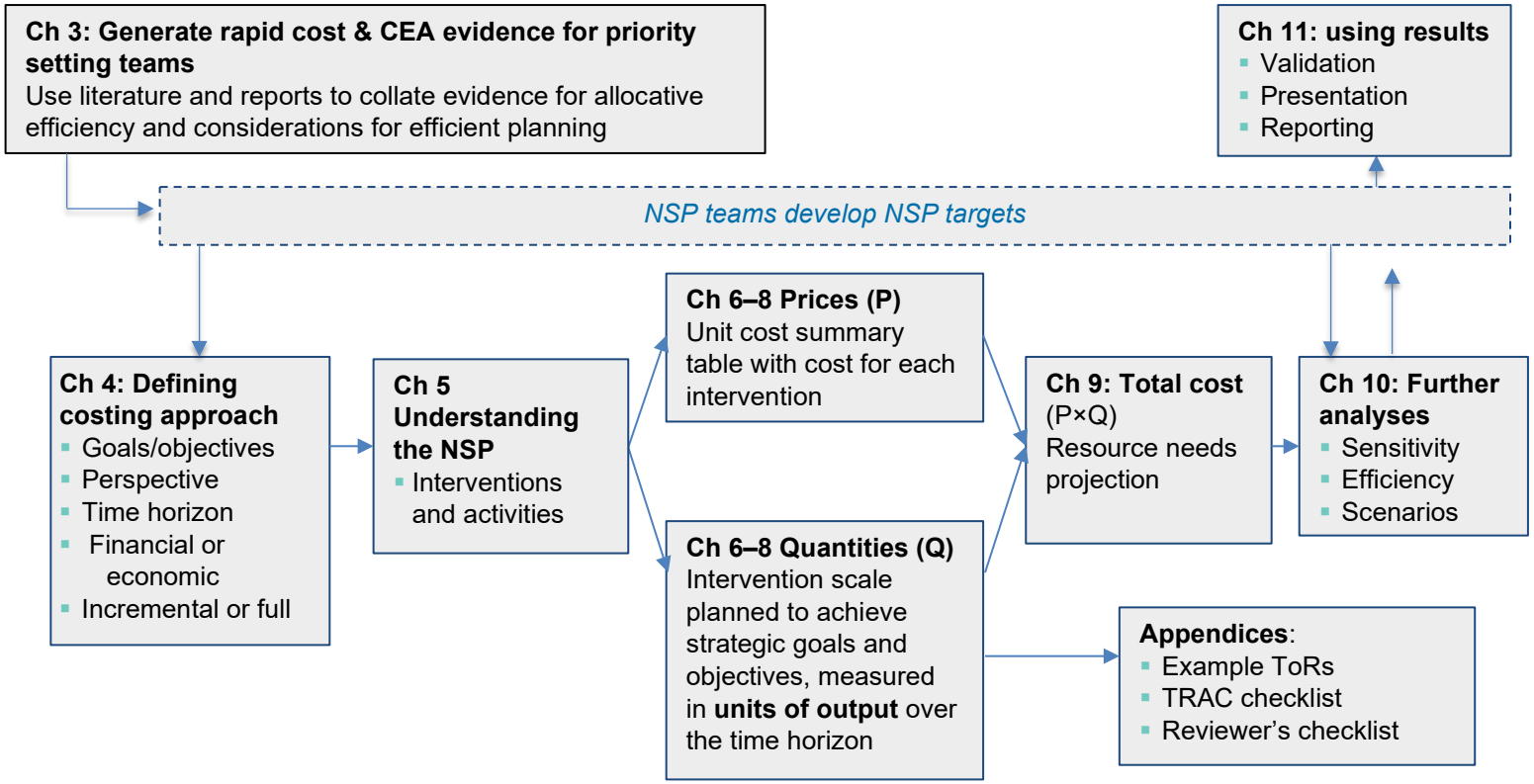
Table 1.2. Chapter by chapter overview

1	**Introduction**	Outlines the purpose, scope, and goals of the guide, along with the motivations behind its creation, setting the stage for a high quality, consistent NSP costing process.
2	**Using the workbook**	Offers best practices for structuring the costing and tracking the progress of the costing exercise systematically, ensuring that source information is well-organized and easily accessible. Available at: https://hivfinancial.unaids.org/NSP costing workbook.xlsx
3	**Collaboration**	Emphasizes how costing fits into broader NSP analysis and highlights the importance of collaboration with the NSP development team and stakeholders. This chapter includes methods for generating rapid cost and cost-effectiveness estimates to support prioritization by NSP teams.
4	**Setting objectives**	Defines the key objectives of the costing exercise and provides guidance on essential design choices to tailor the exercise to the NSP's context.
5	**Identifying interventions**	Guides the team in cataloguing all interventions within the NSP, a critical step in preparation for costing each element accurately.
6	**Reviewing methodological approaches**	The guide's core methodology section provides detailed instructions for constructing unit costs using one or more of the following approaches: ▪ **Adaptation method:** Adjusts existing unit cost estimates to fit the specific NSP context. ▪ **Ingredients based costing:** Model costs from the ground up using local input prices and required quantities. ▪ **Percentage mark-ups:** Applies mark-ups on other intervention costs. ▪ **Lump sum estimates:** Estimates total costs for interventions that may not fit standardized costing methods.
9	**Estimating total costs**	Combines intervention costs to calculate the overall resource requirements for implementing the NSP.
10	**Further analyses**	Explains methods for testing the robustness of cost projections against key assumptions and identifying potential inefficiencies in resource allocation.
11	**Finalizing the cost analysis for use**	Outlines standards for comprehensive reporting, ensuring transparency and replicability of the costing process and results.

The accompanying workbook includes templates that support each step of the costing exercise, from organizing source data to calculating total costs and reporting findings. They are downloadable from the UNAIDS financial dashboard: https://hivfinancial.unaids.org/NSP costing workbook.xlsx. These templates can be adapted to suit diverse NSP configurations and facilitate a consistent approach to NSP costings (Figure 1.3).

Each chapter also has a training video, to be found at: https://www.youtube.com/playlist?list=PLm24qjjmwsqq9hXI41OcLiM1ZZIla_r4P.

Figure 1.3 Overview of the guideline



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Chapter 2: Using the workbook to track your progress

Objective

- Provide an overview of the accompanying Excel tool.

Methods

- Organize and document work in a costing workbook.

Output

- Costing workbook.

Principal actors

- The costing team.

Corresponding workbook tab

Workbook overview.

2.1. Record keeping

Producing a high quality NSP costing exercise requires good organization and even better documentation. The terms of reference for the costing team should specify several specific requirements and deliverables, which may be a good starting point for creating a work plan for the costing exercise (see Appendix 3 for an example). There will be many details to document, both to help in staying organized and completing the job efficiently, and for the end-users of the analysis who want to understand the data, assumptions and methods that underlie the final analysis results. The Transparent Reporting and Analysis for Costing (TRAC) checklist spreadsheet should be submitted with the primary data file and the NSP costing narratives.

To assist with this record keeping, this guide includes a template Excel workbook that can be downloaded from: https://hivfinancial.unaids.org/NSP costing workbook.xlsx and used throughout the project to keep track of key information. Information may also be kept in other documents, such as the literature and reports, with cost data separately as companions to this workbook. The workbook is envisioned as a project hub or a dashboard that is frequently consulted and updated as work progresses. Even if an individual approach to organizing and documenting the work is used, this workbook still provides a good example of the data and analysis that should be considered.

It is important to start by setting up a folder on a computer that is secure and regularly backed up which will be the location for all the many files collected and generated during the project. Software like OneDrive, DropBox, Google Drive, Apple iCloud or Box should be used to ensure that all project work will be backed up on servers in the cloud so that the work is not lost. The

other advantage of using software like this is that the folder can be shared with other members of the team, such as technical working group members.

In this folder, a place should be kept for:

- Source materials, modelling estimates, peer-reviewed costing studies, integrated bio-behavioural study reports and country cost databases. Qualitative data sources should also be saved here, including emails and recorded communication with stakeholders relevant to the NSP, with consent provided to share the conversations
- Background documents, such as former NSPs, investment case reports, mid-term NSP reviews, country testing and treatment protocols, grant applications, PEPFAR Country Operational Plans, programme reports, etc.
- Administrative project documents such as the terms of reference, contractual agreements, invoices, receipts for expenses, and so on.

2.2. Using the workbook

The accompanying NSP Costing Workbook is a resource designed to assist in maintaining records of the work and facilitate the preparation of the TRAC checklist, a required submission for review at the conclusion of the cost projection exercise.

The workbook is organized into five sections:

Preparatory work: Tabs 1.1–1.5

Aligned with Chapters 2–5 of the NSP Costing Guidelines, this section of the workbook provides guidance on the preparatory steps. Specifically, it assists in defining cost methods and scope, identifying stakeholders, mapping out NSP interventions, setting up an effective work tracker, and preparing economic evaluation evidence to inform the NSP priority setting process.

Building cost estimates: Tabs 2.1–2.4

This section of the workbook, corresponding to chapters 7 and 8, provides step by step support in constructing cost estimates using various methodological options.

Putting it all together: Tabs 3.1–3.3

In this section, detailed in chapter 9, unit cost estimates from the previous sections are combined with the quantities (coverage) estimated to achieve NSP targets to calculate the total costs.

Further analysis: Tabs 4.1–4.2

This part of the workbook allows for further analysis of cost estimates beyond the basic cost projection exercise, specifically: (1) Efficiency analysis to estimate the impact of removing implementation inefficiencies on unit costs; and (2) sensitivity analysis and scenario to understand the impact of the assumptions that were made in the analysis of total or unit costs.

Transparent Reporting and Analysis Checklist: Tab 5.

The concluding section houses the TRAC checklist, a critical element for summarizing all cost estimates, methods, sources and assumptions. It provides a comprehensive overview of the costing methods for reviewers, facilitating assessment and feedback. It also provides the details

of the costing for others who may want to build on the analysis in future years or in other countries. It should be prepared properly as it is a publicly accessible resource.

At the start of each guideline chapter, refer to the section **Corresponding Workbook Tab** for guidance on which worksheet is suitable for that specific chapter.

Table 2.1. Overview of the workbook tabs

	Sheet #	Sheet name	Chapter	purpose
1. Preparatory work	1.1	Background	3,11,12	Summarize costing purpose & overall methodology
	1.2	Stakeholders	3,11	Maintain an inventory of all the stakeholders relevant to NSP costing process
	1.3	NSP prioritisation	3	Collate CEA evidence and share key efficiency questions with NSP teams
	1.4	Interventions	4	Collect and update information and details on each intervention that needs to be costed
	1.5	Work Tracker	4	Track costing process, decisions, and methodology
2. Building unit costs	2.1	Literature review	7	Review and select most appropriate unit costs from literature
	2.2	Adapting unit costs	7	Adapt unit costs from literature for inflation, unit of output, and/or programmatic context
	2.3	IBC unit costs	8	Model costs using ingredients-based costing
	2.4	IBC common ingredients	8	List common inputs to ensure consistency
3. Putting it all together	3.1	Unit costs	9	Collate intervention unit costs from the IBC and Adaptation tabs, inputs for Goals
	3.3	Population coverage	9	Estimate coverage by population and year
	3.4	Total costs	9	Estimates the total NSP budget
4. Further analysis	4.1	Efficiency analysis	10	Identify critical in-efficiencies, solutions and the impact on unit costs
	4.2	Sensitivity and scenarios	10	Estimate the impact of internal assumptions and external changes on unit and or total costs
5. Final reports	5.1	TRAC	11	Transparently report costing and verify key elements considered for each unit cost
	5.2	Presenting results	11	Generate cost tables and figures to share results

Chapter 3: Collaboration in the costing process

Objectives

- To ensure the costing process fits seamlessly within the broader context of developing HIV NSPs.
- The chapter provides guidance for effective collaboration between the team conducting costing exercises, the core strategic planning team and other NSP stakeholders.

Methods

- Describing the roles and interactions of the strategic planning team, including high-level leadership, programmatic technical experts and the team.
- Emphasizing the importance of early involvement and continuous communication between the costing team and other team members.
- Using both existing data and stakeholder insights to inform cost projections and ensure alignment with strategic goals.
- Related academic fields/topics: Organizational behaviour, project management, stakeholder analysis.

Outputs that the user would have developed in the course of following this guidance

- Organizational chart for the NSP development project.
- A plan for engaging stakeholders and two-way interactions with the core NSP team.
- Documentation of interactions with TWGs and other key informants.

Principal actors

- High level leadership sets the strategic objectives and oversees the entire planning process.
- Programmatic technical experts provide detailed descriptions of interventions, annual coverage targets and their outputs.
- Cost team presents cost-effectiveness evidence, estimate resource requirements, and ensure alignment with strategic goals.
- Monitoring and evaluation leads collaborate with the cost team to harmonize inputs and outputs, ensuring consistency across the NSP.

Corresponding workbook Tab

1.2. Stakeholders.

1.3. Interventions.

This chapter provides guiding principles for how the team conducting the costing exercise can effectively collaborate with the strategic planning team and other stakeholders. It describes how the costing process fits within the broader context of developing NSPs, identifying critical points

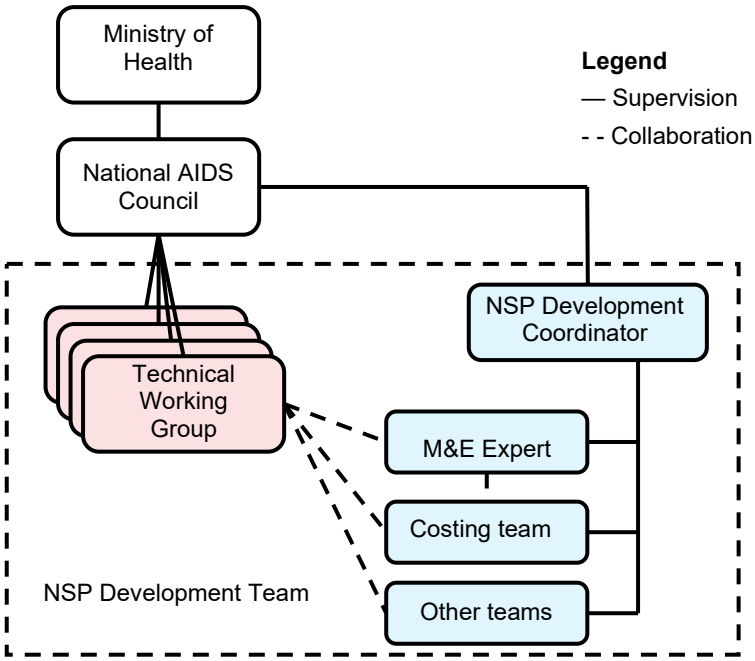
at which communication with other experts is essential. Good communication and coordination help ensure all parts of the NSP fit together without duplication or inconsistencies and harmonizes the process.

3.1. Strategic planning team

Strategic planning is a collaborative process. Typically, a strategic planning team consists of at least three distinct groups: (1) high level leadership; (2) programmatic technical experts who provide content related to the NSP's objectives and interventions; and (3) the team who develop the details of the plan, including timelines, indicators and forecast of impacts, costs and, sometimes, the financing landscape. High level leadership steers the process. With input from technical experts, the leadership establishes the plan's objectives, and the set of interventions and other strategic actions intended to reach those objectives, with specific annual targets. The team will do the work of synthesizing information describing the current state of the epidemic and the response, forecasting the health impact and resource requirements of the planned interventions, and developing a framework for monitoring progress and evaluating the implementation of the strategic plan. In some cases, the strategic planning exercise may also include other aspects requiring analytical support, such as comparing strategic alternatives, assessing allocative and technical efficiency, and mapping financing sources and gaps.

The costing teams primary responsibility will be to: (1) present cost-effectiveness evidence at the start of the process to inform priority setting; and (2) estimate resource requirements and project a budget but may also lead further analyses such as: efficiency analysis, financing gap estimations, and other aspects of the plan. Regardless of the scope of the costing team's work, collaboration with the rest of the team is essential—in particular, the TWGs with expertise in intervention delivery, modellers conducting forecasts of health impact, and those developing the M&E aspects of the plan (Figure 3.1).

Figure 3.1. Prototypical organizational structure of an NSP development team



Being involved early in the development of the strategic plan and establishing good communication with the rest of the team are essential to the success of the cost analysis. The

programmatic technical experts have the knowledge to describe each intervention in the NSP sufficiently for the costing team to assign costs. They provide details on the annual coverage targets, quantity of output of the intervention (i.e. in what unit is output measured, how many outputs are proposed), as well as providing sufficient description of the intervention activities to inform what resource ingredients are needed. Depending on the method of cost estimation used for each intervention (e.g. adapting unit costs from existing cost estimates (referred to as the adaptation approach), or modelling costs based on input prices and quantities (referred to as ingredients-based costing), the costing team may have several conversations with the technical experts, e.g. MoH focal points, to capture the appropriate details.

The M&E expert and the costing team work in tandem throughout the strategic planning process to ensure that the NSP's proposed inputs and outputs are harmonized. When resource limits are expected to limit scale-up of a particular intervention, the M&E plan's targets for the intervention's reach should account for these constraints. The M&E plan and the costing should have consistent assumptions for the annual coverage targets and the rate of intervention scale-up. The M&E expert and the costing team may work with modellers or use modelling software themselves to optimize their projections. Continuous communication between the M&E expert and costing team regarding updates to values, targets and assumptions can avoid reaching the final approval stage only to discover that the expected costs and impact do not match the plans laid out in the NSP.

3.2. Responsibilities of the costing team

The costing team should take the initiative to review the available cost and cost-effectiveness evidence, making this available at the start to inform the priority setting process, making and presenting cost projections, analysing fiscal space, mapping the resources available from multiple funding sources, determining expected financing gaps, and creating plans for mobilizing domestic financing and sustainability.

The costing team may also be asked to develop cost projections for a range of funding scenarios (e.g. continued donor funding, fast track to 95–95–95 goals, constrained resources). A comparison and analysis of these scenarios can make the NSP more valuable for future decision-makers whose available resources may not match the estimated future resources needed, based on assumptions that underpinned the NSP budget cost estimates, when it was initially created.

3.3. Common challenges in the costing process

This guide anticipates several common challenges that a costing team will face during a strategic plan costing exercise and suggests some strategies for overcoming them. Strategic plan costing exercises necessarily rely on information about the cost, scale and implementation of past and current interventions and associated activities. In addition, they require reasoned assumptions about the future.

The first challenge—and an avoidable one—is recognizing that much of the data and assumptions used in the costing exercise are also relevant to other aspects of the NSP. For consistency, the NSP should use a common set of data and assumptions throughout its different sections. This means the costing team and the broader NSP team need to coordinate and agree on what data sources and assumptions to use. For example, budget projections should be derived from the same estimate of the current number of people on HIV treatment found in other sections of the NSP.

Inevitably, there will be data gaps. Some interventions included in the strategic plan may not have been implemented yet. Others may have been implemented, but only as a pilot or on a small scale. Even when an intervention has been scaled up and ongoing for a long time, there may not be precise measures of the resources used to produce the intervention or measures of the intervention's output. Moreover, if the costing team is relying on cost estimates from past studies, they may face challenges in evaluating whether the evidence from past studies is applicable for use in the current costing exercise. Several adjustments may be needed to adapt the evidence to the current setting. This guide presents a systematic approach to assessing the contextual variation between the existing unit cost evidence and the costing exercise's scenarios.

Another challenge is that the output of some nonbiomedical prevention interventions, including those to address societal enablers, can be difficult to measure in quantitative units. For some interventions, the link between the level of coverage of the intervention and the impact on outcomes that are strategic priorities may not be well-understood. In these situations, it can be difficult to estimate how much of a particular intervention is needed, and the costing team will need to rely on technical focal points to inform assumptions. Keep good documentation of those assumptions to be able to understand how much impact they have on the results when the sensitivity analysis is performed.

The allocation of shared costs for HIV interventions can be tricky as well. HIV programmes, especially when integrated into systems that also provide non-HIV services, will rely on health sector infrastructure and other resources that are shared. Costing exercises need a consistent approach to handling such costs. The decision about whether to include them or not depends on how the results of the analysis are expected to be used. Some situations call for a 'full costing' that accounts for the opportunity cost of all resources necessary to produce the intervention. For example, in prioritization decisions where allocative efficiency (see chapter 10) is an objective, any shared resources necessary to produce the intervention should be included in its cost because there is an opportunity cost associated with using those resources. Another example is cost analysis conducted by an organization to help inform decisions related to pricing. If the cost of some resources necessary to produce the intervention are omitted, there is a risk that prices could be set too low, and the revenue generated may not cover the cost of producing the intervention. However, there are situations where it might be appropriate to separately account for the direct intervention costs and the shared costs. For example, when budgeting for a specific entity such as a government agency, it would be reasonable to omit resources that are not paid for by that entity. In this case, there is an assumption that those resources not in the entity's budget will nevertheless be available for production of the planned interventions. The takeaway point for the costing team is that they should carefully consider the implications of how they approach costing of shared resources and, whatever approach is taken, transparent reporting of what was done is an essential part of a costing exercise.

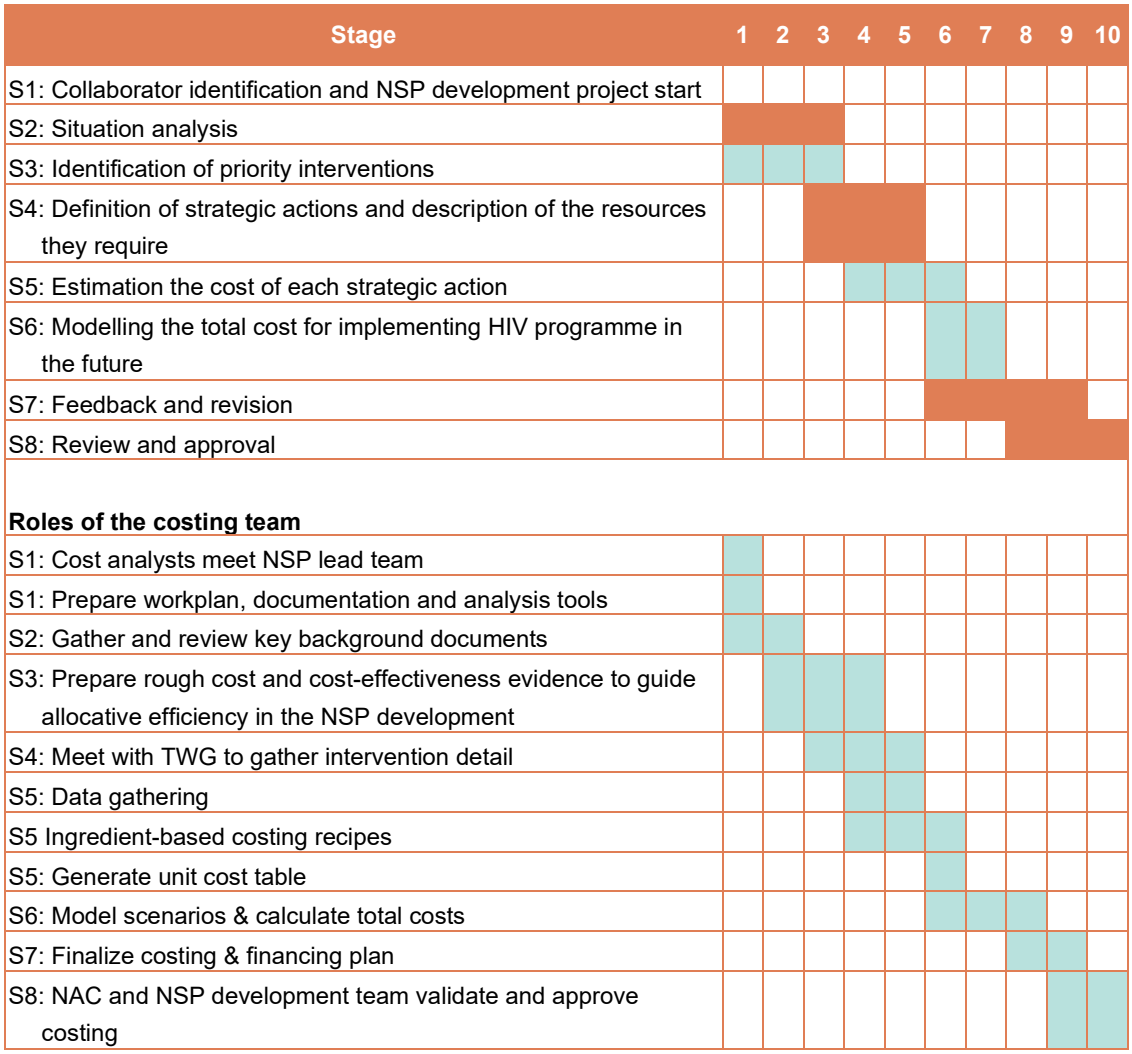
A key theme of this chapter is that a well-coordinated NSP development process, in which the costing team is integrated and has frequent interaction with the rest of the team, can help a lot in dealing with data challenges. It can also improve the credibility of assumptions on which the costing exercise is based, as well as facilitate the data validation process.

3.4. Timeline and steps of a costing exercise

In general, the NSP development process takes six-months to one year to complete, typically following the eight stages depicted in Figure 3.2. Within each stage, there are key times for

communication between the costing team and the other collaborators. These touchpoints are defined below.

Figure 3.2. Prototypical timeline for a costing exercise in an NSP development project



NAC: National AIDS Council; NSP Dev Team: core team responsible for developing the NSP; TWGs: technical working groups with expertise in certain areas of the HIV programme; MoH: Ministry of Health.

Stage 1: Collaborator identification and NSP development project kick-off

A well-coordinated NSP development process depends on all the participants knowing each other, and their roles. The leadership of the NSP development process should facilitate this. For the costing team, this is an opportunity to make sure they have names, contact information and roles identified for each team member they will be working with. In the companion Excel workbook, there is a section where the costing team keeps a list of potential key informants and stakeholders who can contribute technical information to the costing exercise.

Stage 2: Situation analysis

In this stage of the costing process, the costing team gathers and reviews documents that will inform the cost projections. Getting copies of documents, such as those listed in Table 3.1, often requires the assistance of multiple stakeholders, because they are produced by different organizations and document sharing may not be widespread. Taken together, these documents provide an initial overview of the country's HIV response, resource envelope and *areas for quality and efficiency improvements*. This initial overview can help familiarize the cost analysis with the context for which the NSP is being developed. It is also the time to do the initial efficiency analysis and document these at the bottom of the workbook Tab 1.1: Parameters to explore in sensitivity, efficiency, and scenario analysis.

Table 3.1. Analytical documents that provide context for the current NSP costing exercise

Commonly available background documents to review
☐ Most recent NSP for HIV response
☐ National strategic plan for primary health care
☐ National health sector strategic plan
☐ Most recent HIV investment case
☐ Most recent Global Fund funding request
☐ Recent PEPFAR Country Operating Plans
☐ Any recent mid-term reviews of NSPs and NHSPs
☐ Recent UNAIDS National AIDS Spending Assessments
☐ Recent PEPFAR Expenditure Analysis
☐ Global Fund transition readiness assessment report
☐ UNAIDS country factsheet and financing profiles
☐ Economic evaluations of anticipated HIV interventions
☐ UNAIDS sustainability roadmap materials

In addition to reviewing the written resources available, the costing team should, to the extent feasible, attempt to gain insights from local stakeholders regarding their experience with previous health policies, projects, and investments. This stakeholder experience may not be evident in the available documentation, yet the value of this experience is difficult to overstate. The costing team should aim to participate in any consultations that the NSP development team is conducting and may also want to set up their own consultations to focus on issues specific to the costing exercise. Joint consultations coordinated with teams leading other streams of the NSP may reduce participant fatigue and improve consistency across the NSP.

Stage 3: Preparing rough cost and cost-effectiveness evidence to guide allocative efficiency in the NSP development

Based on the evidence gathered from analytical documents, as well as the insights gathered from stakeholders in the country and the costing team's table of state of the evidence on the cost-effectiveness of HIV interventions in the country, the NSP development team will outline a

broad strategic framework. This will usually be characterized by a set of high-level strategic goals in distinct areas of focus within the HIV programme. It is important for the costing team to feed into this process with cost-effectiveness evidence to support allocative efficiency, i.e. that the funding targets spend money on interventions that achieve impact at lowest cost. Workbook Tab 1.5, Informing NSP Priorities, provides a template for collating and presenting these results as well as a list of key efficiency questions to consider in their deliberations.

Stage 4: Definition of strategic actions and description of the resources they require

Within each area of the strategic framework, there will be several strategic actions planned. Many of these strategic actions will be standard biomedical and nonbiomedical interventions (see Appendix 2 for general categorization of HIV interventions, as included in the IHT). Typical examples include the following: for HIV prevention: elimination of vertical HIV transmission; pre-exposure prophylaxis (PrEP); and voluntary medical male circumcision (VMMC). For HIV testing: provider delivered or self-testing; and HIV treatment with adherence and retention support. These services can be facility or community based and delivered by health-care workers (professional or lay), or by affected communities themselves (community led, i.e. 'by-us-for-us'). It also includes interventions to address broader societal enablers: reduction of harmful gender and social norms; promoting gender equality by investing in gender-transformative approaches; an enabling legal environment; and reduction in stigma and discrimination.

Other actions might be better characterized as policy changes, organizational process changes, capital investments and systems level infrastructure development. These could be actions like policy or organizational changes to incorporate more community participation in the prioritization, design and implementation of HIV interventions, human resource training activities, or investment in data collection systems *(1)*. These types of strategic actions are means by which intervention implementation is facilitated, as well as higher-level goals are to be met. Each action usually has programmatic implementation targets (such as the number of people reached, or the number of commodities distributed, or the portion of a target population reached (coverage level), which is specified by year, in the plan.

Stage 5: Estimating the cost of each strategic action

While this guide emphasizes the importance of the costing team being involved and integrated into the earlier stages of NSP development, the core of the costing team's work comes at this stage where costs are estimated. For each intervention, the costing team will review the available primary costing research on the unit cost for each intervention, including unpublished unit expenditure data, and review the assumptions on unit costs as available, possibly comparing with existing intervention databases and costing tools, such as the UHC (Universal Health Care) Compendium, RNM, IHT, etc.

The review should include consideration of the similarity of the intervention's implementation in the setting for which costs were reported, and the intervention proposed in the current NSP, the scope of resources included in the intervention's unit cost and the reported quantity and cost of those inputs. Depending on the availability of usable information on the unit cost of each intervention, the costing team may decide to carry out an ingredients-based costing. This method is useful when there is information on the resource inputs required to produce the intervention. In some cases, other approaches to costing, such as assigning a lump sum to the intervention or assigning a percent markup to other line items in the strategic plan, may need to be used.

Stage 6: Modelling the total cost for implementing HIV programme in the future

Once unit costs are identified, the costing team will combine them with estimates of the quantity of each intervention that will be delivered each year of the NSP time horizon to produce a projection of total cost during the NSP period. In this stage, the costing team may work closely with modellers using software such as the Spectrum/RNM, Goals-ASM, or the IHT, that can project the epidemic's trajectory and estimate the extent of intervention required to achieve strategic goals for health impact.

Stage 7: Feedback and revision

Activities conducted by the NSP development team may be repeated more than once in this stage. The assumptions will be tested in sensitivity analysis to explore the impact of the different assumptions made, and efficiency analysis can be used to identify any potential technical efficiency gains that can be achieved by changing how interventions are implemented in practice. These can be achieved, such as by changing input quantities (changing the frequency of laboratory testing requirements), changing input types (e.g. task-sharing), changing sourcing of inputs (branded to generic drugs), changing the flow and processes of activities, or at the programme level changing the coverage (reaching different populations or subpopulations, or the scale of coverage).

Stage 8: Review and approval

In virtually all NSP development processes, there are steps by which the resulting products are reviewed and ultimately approved by the relevant stakeholders. This sometimes includes an independent peer-review by an outside expert and a convening of relevant stakeholders to present the aspects of the NSP that need approval. For the NSP costing, usually, there is a focus on validating the unit cost assumptions for interventions to be sure that the stakeholders have confidence in those input values. Subsequently, there is often a validation of the NSP Cost Summary Table results—the cost projections themselves. To strengthen quality and confidence in results, the following set of deliverables will be reviewed by the NSP team, the MoH/NAC and the assignment focal points:

- Inception report which should describe clearly the planned approach to the costing.
- Overview of cost-effectiveness evidence for the NSP team based on a rapid literature review.
- Draft analysis workbook.
- Preliminary unit costs of ongoing interventions, with a draft TRAC checklist.
- Slide deck presenting methods and full resource needs by intervention and in total across years. May be combined with a meeting presenting these preliminary results as needed.
- Draft report.
- Revisions, as needed.
- Final report, submitted with workbook and completed TRAC tool.
- Policy brief (where requested).

For more about this stage, see Chapters 9 and 11 dealing with the TRAC tool for the submission of deliverables.

References to Chapter 3

1. Global AIDS strategy 2021–2026: End inequalities. End AIDS. Geneva: UNAIDS; 2021.

Chapter 4: Design elements of an NSP cost projection exercise

Objectives

- There are several overarching design choices in an NSP costing exercise that need to be made at the start since they help locate the boundaries in scope, identify the type of data sought and anticipate the level of effort required. If not prescribed in the terms of reference, the costing team will have to work with the NSP development team to agree on these aspects of the exercise and include them in the inception report. These design choices are discussed below.

Method

- Convene with high-level country stakeholders and conduct a costing framework decision-making exercise.

Output

- Summary report identifying the costing's purpose, time frame, perspective, type and scope of costing.

Principals

- Strategic planning team.
- Costing team.

Corresponding workbook Tab

1.1. Background

1.4. Interventions

This chapter provides guidance on defining the scope of the cost analysis:

- How will the costing be used: for grant proposals, budgeting, funding gap analysis?
- What programmes and services should be included in the costing and what should be excluded?
- What and whose costs will be considered (Table 4.1).

Once these key questions have been answered, the team will be better prepared to select and define the appropriate methods and sources to conduct the costing exercise in Chapters 5–7.

Table 4.1. Summary of key NSP costing design choices

Design element	Standard recommendation	Exceptions and extensions
Purpose	To estimate the full resources needed for implementing the country's NSP, including the costs of the national response programme and the delivery of all HIV and other specified services.	Countries can also conduct a funding gap analysis to determine additional funding requirements, or compare funding requirements between different potential scenarios, which may vary based on targets, financing assumptions, or programming approaches. Alternatively, the costing exercise can be more focused, only budgeting for the national response programme and a subset of activities, while assuming standard HIV services are already properly funded.
Perspective	Multisectoral provider perspective: The resources providers use to deliver services and produce NSP intervention outputs need to be included in the costing. A multisectoral perspective is similar to a health sector perspective (both public and private providers) but includes providers delivering interventions in other sectors, e.g. in education or policing.	The resources that providers use may come from a mix of financing sources. One could take an all-payer perspective, which would have similar results to a multisectoral provider perspective but also take into account all funding sources. The societal perspective, which includes cost from all actors, including providers and users, is not usually taken in a NSP costing.
Resource monetization	Financial cost, i.e. using market prices from financial transactions.	When appropriate, use economic opportunity costs to value resources with no financial cost, and report these costs separately (e.g. when interventions heavily rely on volunteer labour and the national programme plans to compensate volunteers, or where there are significant donated resources, e.g. donated HIV test kits or condoms that may not continue or at scale up.
Full	Full costing includes all inputs used to deliver an intervention, including cost estimates of an appropriate portion of shared inputs and overhead or indirect costs.	Comprehensiveness depends on the costing's purpose. If the exercise is to determine the budget of the national HIV programme only, this may exclude the costs of infrastructure or staffing. However, a full analysis may also exclude some categories of fixed health systems resources for which the portion used by the HIV programme is very small.

4.1. Purpose

The starting point of an NSP costing is to define the purpose for which these cost estimates will be used. This purpose, in turn, will drive the costing's entire design and methodological approach. In other words, the team must first understand 'why' to decide on the 'how'.

In general, a costing falls into one or more of four categories: short-term budgeting and price setting; medium to long term planning; economic evaluation; and technical efficiency. Typically, an NSP costing aims to estimate the full resources required over the next three–five years (medium term) to implement the country's NSP. This includes budgeting the costs of the national response programme responsible for implementing, overseeing and monitoring the NSP, as well as including the costs of delivering HIV and other services and interventions specified in the NSP. For example, if the NSP details an entire prevention strategy that includes outreach to key and vulnerable populations with: (a) behaviour change and communication materials; (b) edutainment events; (c) distribution of condoms; (d) demand creation and delivery of VMMC; and (e) pre-exposure prophylaxis (PrEP), the costing should include both the direct and indirect cost of designing, implementing and monitoring all of these activities.

Countries can choose to expand or scale down the analysis depending on the purpose of their exercise. For example, some countries use the full cost projection results compared with the results from a financing landscape analysis to identify potential funding gaps and advocate for additional funding for specific programmes, or to achieve greater targets. Other countries include cost analysis of different scenarios, highlighting resource requirements for various investment strategies (often called investment cases). Alternatively, some countries choose to limit the analysis to estimating only the costs of the national programme itself and some select activities, as it is assumed that standard HIV services are already budgeted and financed elsewhere. Importantly, part of the medium to longer term planning should include a technical efficiency analysis (see Chapter 10) (Table 4.2)

Table 4.2. Costing purposes and examples

Costing purpose	Description	Examples
Medium to long term planning.	To predict medium to long term resource requirements.	Cost projections for NSP costing, budget impact analyses, investment case, global price tags.
Short-term budgeting.	To predict expenditures by specific budget holders.	Annual programme budgeting, Global Fund funding request, costing of additional resources needed for a new intervention.
Economic evaluation.	To inform allocative efficiency: In the planning and target setting phase of an NSP, information on the costs and impact of the different interventions is required. This allows the projection of project costs as part of economic evaluation (CBA, CEA) to compare value gained per dollar spent for alternative investments (see the Glossary for 'efficiency').	Preliminary cost effectiveness modelling should inform the planning process, to understand how to achieve the greatest health impact, or how much intervention is needed to achieve the targets.

Costing purpose	Description	Examples
Technical efficiency analysis.	To inform technical efficiency: how to structure interventions and services to produce the greatest outputs from the budget (see Glossary for 'efficiency', and Chapter 10).	Analysis of the drivers of unit costs, for example.

NSPs should be informed by a technical and/or allocative efficiency analyses. A technical efficiency analysis evaluates the most efficient mode of delivery for a specific service or intervention while allocative efficiency seeks to understand the best use of resources across multiple interventions and services (see the Glossary). Efficiency analysis serves to drive evidence-based decision making and help stakeholders identify and prioritize feasible, effective and sustainable interventions. Approaches to analysing efficiency are presented in Chapter 10, while most of this guide focuses on medium term planning.

In turn, NSPs may help inform short-term budgeting and funding requests by presenting the gamut of interventions that need to be financed and implemented across the country. Note however, that beyond the evident differences in timespan (medium or short-term), an NSP costing and an annual budget (or funding request) are fundamentally distinct in purpose, scope and design (see Table 4.3).

Table 4.3. Purpose, scope and design of different costing types

	NSP costing	Annual budget	Funding request or budget projection
Purpose	Overview of all the resources needed to implement a country strategy	Roadmap of provider's anticipated expenses	Projection of additional resources needed
Time horizon	Three–five years	One year	One–three years
Perspective	Provider: Country	Provider: Organization or programme	Payer: Funder
Type	Full; with some exceptions	Incremental to components funded from other sources	Incremental
	Financial	Financial	Financial
	Normative best-practice or observed/real world constrained costs	Normative or observed	Normative
Units	Outputs and outcomes	Inputs, outputs	Inputs, outputs, and possibly outcomes
Organization/ categorization	NSP objectives and Interventions	Organized to fit with accounting system's chart of accounts structure	Organized to fit with funder's application structures
Treatment of capital costs	Capital costs annualized or incurred in year of purchase depending on analytical approach	Costs incurred in year of purchase	Costs incurred in year of purchase

- Unlike an HIV NSP costing, an annual budget typically caters to a specific organization or funder, covering a subset of interventions and costs, while an NSP costing is typically broader in scope and includes all the country's HIV activities, delivered by a range of providers.
- NSP cost estimates average over three–five years, smoothing natural cost fluctuations. In contrast, annual budgets demand that costs be attributed to a specific year.
- Funding requests are time-bound and funder specific, considering only their incurred costs. In Global Fund requests, for instance, the budget might cover drug and medical supply costs, while assuming other expenses, such as medical staff salaries, are covered by the country's Ministry of Health, varying per country programme and negotiations.
- While unit costs multiplied by coverage can project total resource needs for the NSP, it may not be suitable for annual budgeting that requires specific reporting of the different inputs (line-item budgeting).

In summary, the costing team needs to discuss with the NSP committee to define and fully understand the purpose of the costing exercise. Depending on the purpose, the scope and complexity of the costing exercise may be large or small, but it must, ultimately, meet the specific needs of the country. Typically, the purpose of an NSP costing is to estimate the full resources needed (project total costs) to implement a country's strategic plan over the medium term, an exercise which can then further be utilized to identify potential funding gaps, evaluate investment strategies and distinguish broader NSP costs from more specific annual budgets or funding requests.

4.2. Perspective

The most common perspectives used in health-related cost analysis are societal, health sector, provider, or payer (see 'perspective' in the Glossary). Usually, NSP costing adopts a provider's perspective, meaning it focuses on the costs incurred by all providers delivering HIV interventions. A provider perspective is convenient because it is not limited to the health sector and can include public, NGO and private providers. An NSP costing from a provider's perspective would include all costs regardless of the expected financing source. In contrast, some costing teams take a 'payer's' perspective that restricts it to costs incurred by a specific payer or category of payers. This can be useful when constructing a funding request or budget for a specific funder.

Although guidelines for economic evaluations of health interventions often recommend a societal perspective for public decision-making, this approach is rarely suitable for costing NSPs. A societal perspective considers all contributors, including costs incurred by clients, beneficiaries, providers, users, and even caregivers, such as, travel expenses and time spent. This makes the analysis much broader, as it can also include the economic impact of HIV interventions on productivity. However, policy-makers are usually more interested in the direct health benefits for patients and the savings from preventing HIV. Analyses that consider the costs of inaction often highlight these broader impacts and can help convince Ministers of Finance/Treasury to allocate funds for HIV prevention to avoid broader economic consequences. In this case, using a societal perspective, the purpose of the costing is to provide an exhaustive view of the economic costs and benefits and justify broader investment in HIV interventions. In other words, it can be a powerful advocacy tool but is less suitable for financial planning.

HIV NSPs are collaborative strategic documents that reflect a country's multipronged, multisectoral and integrated approach to fighting HIV/AIDS. As such, they refer to many different providers (direct-service health providers, above-service level professionals, and non-health related actors), many different health areas (mental health, tuberculosis, reproductive health, etc.), and interventions that address societal barriers (gender-based violence, stigma and discrimination, criminalization and human rights abuses, etc.).

For the costing team, this means that defining the provider is a particularly crucial step, as this will then determine which interventions and costs should be included in the costing. When the team later collect detailed information on the NSP strategies and interventions (Chapter 5), they will have to decide whether or not to fully or partially include costs of other health services (such as TB screening, other non-health services such as cash transfers to orphans and vulnerable children (OVCs)), and services delivered by the private sector, including non- and/or for-profit providers, and even possibly the *broader health sector* to avoid double counting or creating gaps in assumed well run services. The chosen costing perspective will help outline the overall scope and delineate inclusion and exclusion criteria. Additionally, defining the perspective will help to align the HIV NSP costing with broader health sector planning and costings, and help ensure that costs are not double counted elsewhere (Table 4.4).

Table 4.4. Defining the provider in the NSP costing exercise

If you take the following providers' perspective:	Scope		
	Include	Exclude	Example
National AIDS programme	Cost of the national programme itself, and all publicly funded services specific to the prevention, testing and treatment of HIV/AIDS	Costs of any intervention that does not directly relate to the national HIV/AIDS programme	TB screening, testing and treatment of people living with HIV (PLWH) would be excluded from the HIV NSP costing and assumed to be covered by the national TB programme
Ministry of Health	All public health-services that directly and indirectly support the prevention, testing and treatment of HIV/AIDS	Any non-health-related service	TB services for PLWH would be included Cash transfers to OVCs would not be included
National government	All public services (health and other) that directly and indirectly support the prevention, testing and treatment of HIV/AIDS	Any services provided by the for-profit or non-profit private sector	TB services for PLWH and cash transfers to OVCs would be included A peer education and sensitization project ran by a nonprofit organization would not be included

If you take the following providers' perspective:	Scope		
	Include	Exclude	Example
Country/all	All public and private services (health and other) that directly and indirectly support the prevention, testing, and treatment of HIV/AIDS	Usually excludes costs to the patients/clients.	TB services for PLWH, cash transfers to OVCs, non-profit and for-profit services would be included

4.3. Valuation of resource use: Financial or economic

The primary purpose of NSP costing is to gain an understanding of how much funding needs to be mobilized to successfully carry out the planned activities and interventions. The overall cost projections reported in an NSP usually focus on the financial value of required resources, since this is what the financing sources will need to spend. This is called financial costing, i.e. based on what needs to be spent in the past. However, with growing reliance on the community-led response, valuing all resource costs used in an intervention, specifically volunteer time and donated goods, i.e. economic costing, should be increasingly considered, especially for countries looking to fairly compensate volunteer labour and other in-kind community responses.

In many places, HIV interventions rely heavily on unpaid, or underpaid community participation, which has significant value. Capturing the quantities and values of donated labour in an NSP costing may be of interest to country stakeholders, as these resources are critical for successful implementation and may later need to be financially purchased/recompensed if future donations are insufficient. The costing can therefore consider the economic value of these contributions, indicating volunteers or the community are the financing source.

In sum, the costing approach should be selected based on the purpose of the analysis. If the goal, as is typically the case, is to value the financial costs of the NSP and mobilize funds, including volunteer time and donated goods may overstate the funds required. However, if the purpose is to estimate the full value of all resources needed to deliver the NSP, considering the role and in-kind contribution of the community HIV response, then an economic costing should be considered as an additional output of the costing exercise.

4.4. Full versus incremental costs

Another decision the costing team will need to make when designing the costing exercise is what to do about resources that are required to deliver NSP interventions, but which are 'shared' between the HIV programme and other health or social programmes. The most obvious example is the clinical infrastructure of the health system (i.e. the clinics and hospitals). Even if there were no HIV interventions, the clinics and hospitals would still be needed for other purposes. Especially when the HIV programme represents a small portion of the overall health system, one might choose to omit those health infrastructure costs from the NSP budget. On the other hand, the HIV programme requires that this infrastructure be in place, and it is using part of this infrastructure, so it is appropriate to allocate a share of this infrastructure cost to the HIV programme when estimating its 'full cost'. These are not included when taking an incremental costing approach. In this approach, only additional resources needed to add the

intervention onto existing services are captured. This is only suitable if it is expected that the existing interventions and infrastructure have reliable funding into the future. If not, then there is a risk that incremental costs will be insufficient to support the full costs of the programme—it will become depleted over time and unsustainable.

In practice, there are always some resources that are required, but may not be included in the NSP costing. The team needs to be clear about the criteria being used to decide what resources are going to be counted. When the objective of the NSP costing exercises is to estimate the 'full' cost of the HIV programme, the team should attempt to include the portion of all shared resources that the programme uses. However, even in these cases, the choice may be made to explicitly exclude some shared costs, such as the physical infrastructure of the health system (e.g. buildings, utilities and other overhead costs).

The costing team must be transparent and consistent about the boundaries they establish regarding the resources that will and will not be counted. Ideally, this should be decided and documented before reviewing existing evidence on HIV intervention costs. When the team is reviewing existing evidence on the unit cost of HIV interventions, they will want to be aware of what resources were counted when those unit cost estimates were made to determine if its scope is consistent with that chosen for the NSP costing exercise, and the adjustments needed to use that evidence in the NSP costing exercise.

4.5. Consideration of real world deviations from normative (best practice) patterns of resource use

The team should also determine beforehand whether interventions will be costed according to normative best-practices, i.e. assuming the intervention operates optimally according to protocols, or according to rea world circumstances, i.e. as implemented in actuality. Indeed, the difference in costs between one or the other can be significant (see Box 4.1). Real-world costs, often estimated from observational studies, better reflect the actual costs associated with interventions because they reflect delivery of services in the context of numerous constraints and practical realities. Normative costing may involve modelling costs based on the anticipated use of resources and expected outputs often described in clinical protocols or technical guidelines. Normative costs provide a benchmark, or standard which stakeholders and implementers can then strive to meet. If using observed costs of a substandard programme, where many of the activities are not provided due to resource constraints or other reasons, there is a risk that the costs estimates will not be sufficient to implement a high quality intervention. At the same time, normative costing can also underestimate unit costs, where there are inefficiencies, such as lower than optimal demand/service use that lead to higher unit costs.

Box 4.1. Example of how observed costs differ from normative cost estimates

A study on the costs of oral PrEP initiation and continuation in Zimbabwe *(1)* found that among a starting cohort of 4617 clients, at six months, only 25% of clients continued on PrEP. On average, clients attended only 2.7 visits out of an expected seven–eight visits scheduled by health facilities. Consequently, the average cost per person-year for PrEP was $943 (in 2018 US dollars) in the real-world setting. This cost was higher than the projected normative cost, which assume clients adhere to treatment guidelines and complete the expected number of visits. Under normative assumptions, where clients continued on PrEP for at least six months as per treatment guidelines, the average cost per person-year on PrEP would have been cut by more than half. The higher real-world costs reflect inefficiencies due to lower client retention and fewer follow-up visits spreading fixed costs over fewer clients. Thus, the study authors recommended exploring the use of demand creation activities that not only incentivize PrEP initiation but also encourage follow-up and adherence.

In the case of an NSP, cost the team must decide whether to use the higher real-world costs of a PrEP programme or the modelled lower costs of the programme if it was functioning according to protocols. If choosing the latter, it is prudent to allocate additional funds for demand creation to avoid under-budgeting and to enhance programme success.

Because differences between observed and normative costs can be vastly different, it is important for the team to clearly state which approach they use across the analysis.

Note that this decision may not always be consistent across interventions. For example, a team may cost interventions based on how they function in practice but find that certain interventions are so new that they must rely on newly drafted guidelines—knowing well that these may later change as countries learn from implementation experience. Other the team may elect to cost interventions as they are meant to operate, assuming the NSP should set the standard for service delivery. However, they may selectively cost certain interventions as seen in observed practice due to their actual higher unit costs to avoid a potential shortage in funds. In either case, these decisions should be justified and reported.

For further information and discussion of the design choices in this chapter, the team can refer to the Glossary, as well as other costing guidelines such as the GHCC reference case *(2)* (specifically principles 1–5). These principles are fundamental to any costing exercise and have been applied across health areas, such as in the: Costing Guidelines for HIV Prevention Strategies *(3)* (Chapter 2); the Rapid Syphilis Test Toolkit: Guidelines for Cost-Effectiveness Analysis of Syphilis Screening Strategies *(4)* (Chapter 3); the PrEP Costing Guidelines *(5)* (pp. 23–34); the Guidelines for Costing of Social and Behavior Change Health Interventions *(6)* (pp. 14–27); and the Decision-making Aide for Investments into HIV Prevention Programmes among Adolescent Girls and Young Women *(7)*.

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Chapter 5: Identifying and describing the interventions for cost projections

Objectives

- To undertake an NSP costing, the team must know what needs to be costed. To this end, the costing team requires a specified list of interventions with sufficient detail of implementation characteristics considerations. The details are crucial for understanding and properly capturing resource needs for each intervention. This chapter outlines the process of reviewing and detailing the set of national strategies, programmes and interventions that need to be costed.

Methods

- Meet closely and regularly with the strategic planning team and TWGs to review NSP interventions and document their implementation details. This usually involves participating in ongoing TWG meetings, maintaining regular communication, and following up consistently, as information is often shared piecemeal, and decisions evolve over time.
- Identify big ticket interventions and conduct process maps with relevant stakeholders to identify essential inputs.
- Take this time to also collect annual targets for each intervention but refer to Chapter 9 for greater detail on estimating total costs. Here the focus is on defining the interventions and capturing necessary details on resource use for accurate costing.

Output

NSP and costing alignment spreadsheet.

Principal actors

- Strategic planning team.
- Technical working groups.
- The costing team.

Corresponding workbook Tab

1.3 Interventions.

1.4 Work tracker.

1.5 Informing NSP priorities.

5.1. Achieving clearly described interventions and activities

The team need to understand each intervention in terms of who, what, where and how to appropriately capture the resources that are—or will be—required for implementation. This step

is fundamental to all costing exercises; curtailing or neglecting it will undermine the costing team's work. Without a comprehensive list of NSP interventions, the costing may omit new or ongoing interventions and thus contain significant gaps in final cost estimates. Furthermore, suppose the team is merely given a long wish list of interventions with little to no information on their strategy, approach, activities, or annual targets. In that case, they will not be able to capture the unique resources needed for each intervention, resulting in insufficient or unsuitable resource need estimates (Box 5.1).

Box 5.1. Importance of understanding implementation for projecting costs

A country decides to leverage the community response to deliver differentiated HIV services, such as home-based and community HIV care and treatment for stable antiretroviral (ARV) clients. NSP stakeholders neglect to communicate this new approach and strategy to the costing team. With limited information, the costing team assumes ARV treatment for stable clients will require the same costs and resources as the last NSP round, and neglects to account for the new community-based strategy. Specifically, the costing neglects to account for reduced personnel costs attributable to task-shifting, from facility-based staff to community-led organizations, and for increased capital costs for start-up and recurrent training of peer navigators, transport of ARV medications and mobile services, and set-up of a community-led monitoring system. In this hypothetical scenario, the cost of community-led differentiated service delivery is underestimated *(1)* and insufficient resources are allocated to the intervention. In other country contexts, the cost of the new approach may be cost-saving *(2)*, and incorrect estimation leads to suboptimal resource allocation, thus gaining less health benefit than could have been achieved.

At the outset of the exercise, as part of the inception report, the costing team will collate existing cost data from within the country and relevant countries to understand approximate costs of all possible interventions and what drives their costs. These baseline data are also used to inform the NSP technical teams of the potential costs and impacts of different interventions so they can use this evidence in their own planning and priority setting exercises (Workbook Tab 1.5).

These costs can already start being adjusted to the country setting, while the country working groups finalize the plans (Workbook Tab 2.2 and further guidance in Chapter 7). Once the NSP is drafted, the costing team can quickly adjust and adapt the estimates for the specific nuances that are planned and capture any unforeseen interventions or activities. This can be done concurrently with the country stakeholders' deliberation and conceptualization of the overall NSP strategy.

Ideally, an investment case will inform the NSP by identifying the most locally relevant, impactful and cost-effective interventions for the HIV response. The NSP costing exercise can also build on the investment case costing exercise. Where an investment case has not been done, the team will need to support the NSP strategy development by helping to identify high-value HIV interventions for consideration, i.e. the cost-effectiveness evidence as mentioned in Chapter 2, stage 3. Substantial global guidance (from WHO and UNAIDS) exists to help select a set of prioritized HIV interventions that are likely to produce outcomes that meet strategic goals. These guidelines are not always tailored to country-specific settings, but they provide a valuable starting point.

At this stage, the NSP process receives input from several established TWGs with expertise in particular areas of the HIV response to further elaborate the specific detail on the coverage, resource requirements, health impact, implementation details and potential challenges of planned interventions. As mentioned in Chapter 3, the costing team must routinely meet with the TWGs to collect essential information on each intervention and adjust, when necessary, for potential strategic or programmatic changes.

It is important to note that defining the interventions and gathering crucial information is an ongoing process that requires frequent check-ins throughout the costing and NSP development. This iterative approach may lead to new additions, adjustments and changes to the list of NSP interventions, reinforcing the need for the costing team to be proactive, flexible and prepared for evolving circumstances (see Box 5.2). It is important to note that obtaining baseline coverage data can also take time. Costs the team should work closely with modellers or monitoring and evaluation teams to ensure access to the recent and accurate data that are consistent with the other sections of the NSP and ultimately estimate total costs (Chapter 9).

Box 5.2. Taking a proactive approach

The costing team is advised not to wait for a finalized, polished list of interventions before commencing the costing process. During the development of the NSP strategy, the costing team should take a proactive approach to help facilitate a more streamlined and adaptable process as the NSP strategy evolves. Following the initial rapid review of the cost-effectiveness of different interventions that the team has provided to the NSP teams, a rapid review of the cost evidence is needed. This involves anticipating what common interventions are likely to be in the NSP (the current strategy is a good starting point for list of current interventions) and conducting a review of pertinent literature: both published and grey literature, expenditure reports, etc. The early stages provide an opportunity to gather foundational information, such as the country's treatment and testing protocols, the size of various target populations and their current coverage levels, the necessary equipment and supplies and other cost inputs that will need to be considered to project costs.

Utilizing these initial data, the costing team can prepare a draft unit cost for each intervention that can, later, serve as a basis for further refinement as more specific implementation plans become available (see Chapters 7 and 8 for guidance on projecting costs).

This chapter presents the information that should be collected for each intervention to facilitate the costing. Identifying these details will allow the team to ensure that their costing will be aligned with the NSP and chart an effective work plan.

5.2. Revising interventions

Use the Costing Workbook (Section 1.3. Interventions of the Excel Workbook), inventory of existing HIV interventions and populations.

Collate existing data from past NSPs, recent research studies (for example, integrated biobehavioural studies), current testing and treatment protocols, and detail activities and scale of implementation and delivery platforms (for example, facility-level, mobile, community-level, etc.).

Consult with the NSP strategic planning team to understand the NSP's overarching vision, mission, principles and strategic framework, and identify potential new response areas, interventions and associated resource requirements which will need to be reflected in the new NSP costing.

The costing team must first consult with the strategic planning team to understand the NSP's overarching strategy. This strategy will typically be informed by a previously conducted analysis on the country's successes and ongoing challenges, including consultations with national and subnational stakeholders, and the latest epidemiological evidence. A 'new' NSP, may, for example, want to prioritize a multisectoral response, target a new, thus far overlooked, population, invest in biomedical innovations, or promote research and data-driven decision making, etc. (see Table 5.1 describing an example from the Zambian NSP, 2023).

Understanding each of these key characteristics will allow the team to determine how this NSP may differentiate from former strategic plans and, by consequence, begin to conceptualize what new resources may be needed. Furthermore, in future discussions with TWGs, it will allow the team to ask the right questions to verify the vital details regarding interventions and their approach are not inadvertently omitted.

Table 5.1. What Zambia's NSP priorities may suggest to a costing team

Zambia's HIV NSP 2020–2023 prioritized the following dimensions *(3)*	What may this suggest to the costing team
Sustainability of the national response	Sustainability may imply efforts to move towards decentralization, improved accountability, mobilization of community leadership, and multisectoral cooperation, indicating not only a potential shift in approach but also increased health system investments.
Prioritization of key population interventions based on evidence	Prevention and care may be customized to target key populations. Key populations may include new subpopulation categories, based on evidence. Interventions may include new approaches such as community-led delivery, innovative programs, and biomedical HIV prevention, which all require different levels and types of resources.
Differentiation of approaches in diverse geographical locations based on impact and value for money considerations, balancing between biological and structural drivers of the epidemic in Zambia.	▪ The NSP may include geospatial mapping and profiling to inform strategic resource allocation and tailoring of interventions to community needs and characteristics. This may suggest an investment towards health management information systems. ▪ Programming may address social and structural drivers of the epidemic and may include cross-cutting systems enablers and interventions promoting human rights and gender equality and an enabling legal environment. ▪ A set of 'high impact interventions' will have been identified by the NSP team and will likely require process mapping to identify key activities and ingredients.
Positioning of high impact interventions based on efficiency of approach, scope and scale in reducing new annual HIV infections.	A further efficiency analysis will be needed to consider if the programme is more efficient when delivered integrated with other interventions (economies of scope) or the unit costs when scaling up (economies of scale).

When meeting with the NSP Steering Committee, the costing team can ask the following questions to help collect the necessary information and resources (Table 5.2).

Table 5.2. Sample questions for the NSP Steering Committee to understand the NSP vision, mission and principles.

1.	Research and evidence	Takeaway for costing
1.1.	What research and analysis have been conducted prior to the development of this NSP?	Collect key documents that will provide crucial costing, demographic and epidemiological data.
1.2.	Is there a copy of these reports, and can they be shared? (Example: Mid-term review of the last NSP, demographic health survey, integrated bio-behavioural survey, Spectrum data file, HIV investment case).	
1.3.	Among the programmatic successes identified in these reports, which will the team leverage in the development of this new NSP? (Example: PEPFAR PrEP pilot was a success, so the government plans on scaling up the intervention nationally.)	Identify programmes and interventions that will likely remain or expand in a new NSP.
1.4.	Among the programmatic challenges recognized in these reports, which will the team focus on in the development of this new NSP? (Example: ART adherence targets were not met so the new NSP will focus on differentiated treatment services and community-based adherence support.)	Identify programmes and interventions that will likely change or be adapted in a new NSP and thus require consideration of new potential resources.
2.	Strategic framework	
2.1.	Can a copy be shared of the existing draft of the NSP log-frame detailing overarching goals, objectives, subobjectives and coverage targets for each year of the NSP period? What has/has not yet been developed and elaborated?	Collect existing NSP interventions and details and identify remaining gaps that will need to be eventually costed. If a log frame has not been developed, encourage the teams to develop one as this can be extremely useful to all stakeholders, including the costing team.
2.2.	Who and what TWGs have been organized to work on each of these goals? Where are they in the process of elaborating on interventions and their details and can the expected timeline be shared?	Identify the TWGs that will need to be contacted for follow-up and the expected NSP timelines.
2.3.	What key strategies or approaches will differentiate this NSP from the former one?	Identify any significant differences in strategy between the new and former NSP which may signal new programmes, interventions, or resources.

Note that not all country NSPs will have a strong steering team spearheading the process. In some contexts, this process is rather decentralized and the deliberation on the NSP's overarching vision, mission and principles may take place at the end rather than at the start. Depending on context and leadership, the costing team may have to refer directly to TWGs and other stakeholders to collect this information.

Step 1: Meet with each Technical Working Group

Objective

Collect baseline information on each intervention that needs to be costed

Technical working groups will typically convene on a programmatic area, set specific national goals on an established timeline, and agree on a set of interventions and corresponding targets to meet these objectives. The TWGs are composed of different stakeholders representing the national and subnational public-health sector, the for-profit and nonprofit private sectors, international development and local community and civil society organizations. Each group will customarily be led by a selected representative who is responsible for ensuring the development of a comprehensive but feasible programme that responds to the current epidemiological, political and social conditions that were identified.

From these TWGs, the costing team must collect a set of baseline information on each intervention that will be included in the NSP and need to be costed. Ideally, this work should be done ahead of time and the team should be given a completed spreadsheet with all the required details, as listed in the table below. In reality, this has rarely been the case, and the team must organize recurring one-to-one meetings with TWGs and/or representatives to collect the necessary information.

At this stage of the NSP costing, the details provided do not need to be extensive. Moreover, representatives and members of these TWGs will not likely be able to provide detailed information on the operations and resources of each intervention—this work will have to come later. At this stage, the most important information to collect is: (1) the complete list of interventions; (2) their basic details; and (3) the name and contacts of persons who will be able to provide greater detail and information at a later stage.

The necessary information is provided in Table 5.3 and needs to be collected for each intervention that will be included and specified in the NSP (see Excel Tab 1.3. Interventions).

Table 5.3. Summary of the information to collect on each NSP intervention from TWGs

Header		Guidance	Input examples
Framework	Intervention	One by one, make a row in the Excel sheet for each of the interventions identified by the TWG	HIV self-testing delivery
	Sub-objective	What sub-objective has the TWG identified?	Expand and offer HIV testing services in and out of health facilities
	Programme area	What programme area does the intervention relate to?	HIV testing

Header		Guidance	Input examples
Intervention details	Target population(s)	What population(s) does this intervention seek to target? Indicate if not stated/indicated by the TWG	Adolescents and young adults
	Delivery platform	At what site level is this intervention expected to be delivered? Indicate if not stated/indicated by the TWG	Fixed site or Community-level (mobile)
	Implementer	Who is delivering this intervention? Organizational type or sector	Public sector; or private international for profit; or private national for profit; or international nonprofit; or national nonprofit; or Community or civil society organization nonprofit; or Community-led organization; or Other.
		Additional details	(Name of organization)
	Scale	At what general scale is this intervention expected to take place?	National; or regional; or targeted sites; or other
		What is the expected coverage target for each year of the NSP period?	Example: 15% of adolescents and young adults, constant.
	New/routine	Is this a new or routine intervention? If new, has it formerly been piloted in the country? If routine, does the TWG expect there to be changes/adaptations to its approach?	Routine intervention, no adaptations; or routine intervention, adaptations needed; or piloted/recently implemented intervention, adaptations and/or scale-up needed; or novel intervention, no pilot or prior country implementation done.
		Additional details on expected changes	Piloted by (name of national NGO) in (year) and national scale-up expected between (year–year)
	Activity details	How will this intervention be delivered? What activities are described?	To understand scope of activities Training of trainers for peers on HIVST, incremental scale-up region by region, national social media campaign, school-based education campaign, peer to peer distribution of free HIVST kits, monitoring and evaluation
		Who can provide additional details on this intervention, if necessary?	Name, contact information, role, organization

Step 2: Develop a workplan

After collecting baseline information on NSP interventions, the costing team can develop a workplan (see Section 1.4. Work Tracker of the Costing Workbook). This workplan will help the team map out exactly what interventions need to be costed, how they will be costed and strategically determine where to invest their limited time and effort in the costing.

The costing team must now revise the full list of interventions that will be included in the NSP framework and evaluate which need to be included in the costing, and whether these will be costed in full or partially. See Chapter 4 for further guidance on defining the purpose and scope of the costing.

Next, the team should identify, among this list of interventions, the 'big-ticket' items. These will be interventions deemed particularly important by NSP stakeholders either because they:

(1) Represent a large share of the total cost. **Example:** Some interventions, such as ART can often represent anywhere between 40–80% of a country's total NSP resource requirements. Because they represent such a large share of the overall NSP, it is important to spend considerable among of effort on these interventions and get as close to the true cost estimate as possible.

(1) May become an important part of the country's future response. **Example:** PrEP interventions, while to date PrEP has only contributed to a small share of NSP resource needs estimates, but may increasingly become prioritized, or the programme may be expanded to also include vaginal rings or long-acting injectable PrEP. In such a case, there will be little historical data to suggest the intervention is a country priority. However, based on new discussions with stakeholders, the team and NSP team members may identify this intervention as a potential big-ticket item. Other examples include community-led response and integration of services.

(2) Include the use of innovative technologies or changes in delivery approach. **Example:** As in the example above, and lessons from HIV self-testing, there are new technologies, drugs, medicines and approaches emerging in the international HIV response. Even interventions that are considered 'routine' are often re-invented, or adapted, and thus require special care in costing to account for these changes. An example of this is the introduction of long-acting injectable PrEP (e.g. cabotegravir), which shifts the delivery model from daily oral pills to bi-monthly clinic-administered injections. This change has significant implications for cost inputs such as staffing, cold chain requirements, client follow-up and service delivery platforms and will need to be incorporated into the cost estimate.

(3) Are unclear. **Example:** Programme areas, such as M&E, laboratory support, programme management and community strengthening, are often estimated, either as large lump sums or percentages of direct costs (see Chapter 6). This often suggests a lack of certainty on the specific interventions and real costs of these programmes and require further investigation, especially if estimates are high or if the country expects to increase domestic funding for these programs.

(4) Are politically sensitive. **Example:** A programme or intervention that is politically charged will likely be subject to greater scrutiny from country stakeholders. In countries where key populations are criminalized, outreach programmes servicing these populations may be subject to resistance or persecution. It is important to spend time to value these programmes accurately and in close partnership with relevant stakeholders to account for any additional costs these environmental factors add.

Once the team has identified these big-ticket items, they can arrange one-on-one interviews with relevant key informants to develop process maps, which will allow the team to identify and estimate key resources. Chapter 6 provides details on how to develop a process map for these select interventions.

After identifying all the interventions that need to be included in the costing, the team will need to decide which approach or method they will use to estimate their costs. Most likely, the team will use a combination of different methods, relying in part on the literature to find already existing estimates, and modelling costs for other interventions, using an ingredients-based approach. Chapter 6 provides guidance on identifying the most suitable approach.

In addition, the team can use the work tracker sheet to jot down notes to themselves about the status of their work, reminders, or next steps. This tool can be used as much or as little as they find helpful—it's simply there to support planning, coordination, and staying organized throughout the process.

References to Chapter 5

1. Nichols BE, et al. Community-based delivery of HIV treatment in Zambia: costs and outcomes. AIDS. 2021; 35:2:299–306. doi: 10.1097/QAD.0000000000002737.
2. Roberts DA, Tan N, Limaye N, Irungu E, Barnabas RV, Cost of differentiated HIV antiretroviral therapy delivery strategies in sub-Saharan Africa: A systematic review. J. Acquir Immune Defic Syndr. 2019;82(3):S339–S347. doi: 10.1097/QAI.0000000000002195.
3. The revised Zambia HIV and AIDS strategic framework 2020–2023. Lusaka: Ministry of Health; 2020.

Chapter 6: Choosing a method for estimating intervention unit cost

Objectives

- Select a costing method for each intervention being considered for inclusion in the NSP. (Tab 1.4)
- Identify the corresponding data sources and key informants.

Methods

- Working from the list of interventions provided by the NSP Steering Committee/TWGs, determine if the intervention is one for which its quantity of output can be easily summarized in a clearly defined unit output measure. Gather information resources such as past local costing studies, expenditure reports and National AIDS Spending Assessments (NASA), price lists, inventory reports, and other relevant documents. Identify data gatekeepers and potential key informants with intervention specific expertise. For those interventions where output can be measured in discrete units, assess the information landscape to determine whether sufficient evidence already exists regarding its unit cost that might be adapted for the current NSP costing exercise. Where evidence on an intervention's unit cost is sparse, gather information describing the inputs used by the intervention, and pursue an ingredients-based costing approach. When the output of an intervention cannot be easily measured in discrete units, consider an alternative costing approach such as a lump-sum or a percentage markup.

Outputs

- From the intervention list, the costing team will build a workplan indicating which costing approach will be used for each intervention and summarizing the anticipated information sources that will be used. The team should keep organised notes on interactions with key informants and data sources obtained. Keeping records of task progress in this way will not only help keep the work organized and efficient but also will greatly aid with ensuring detailed documentation of the costing exercise.

Corresponding workbook tab

2.3. IBC recipes.

2.4. IBC common ingredients

Principal actors

Primarily the costing team. Also, higher level managers of the NSP development process.

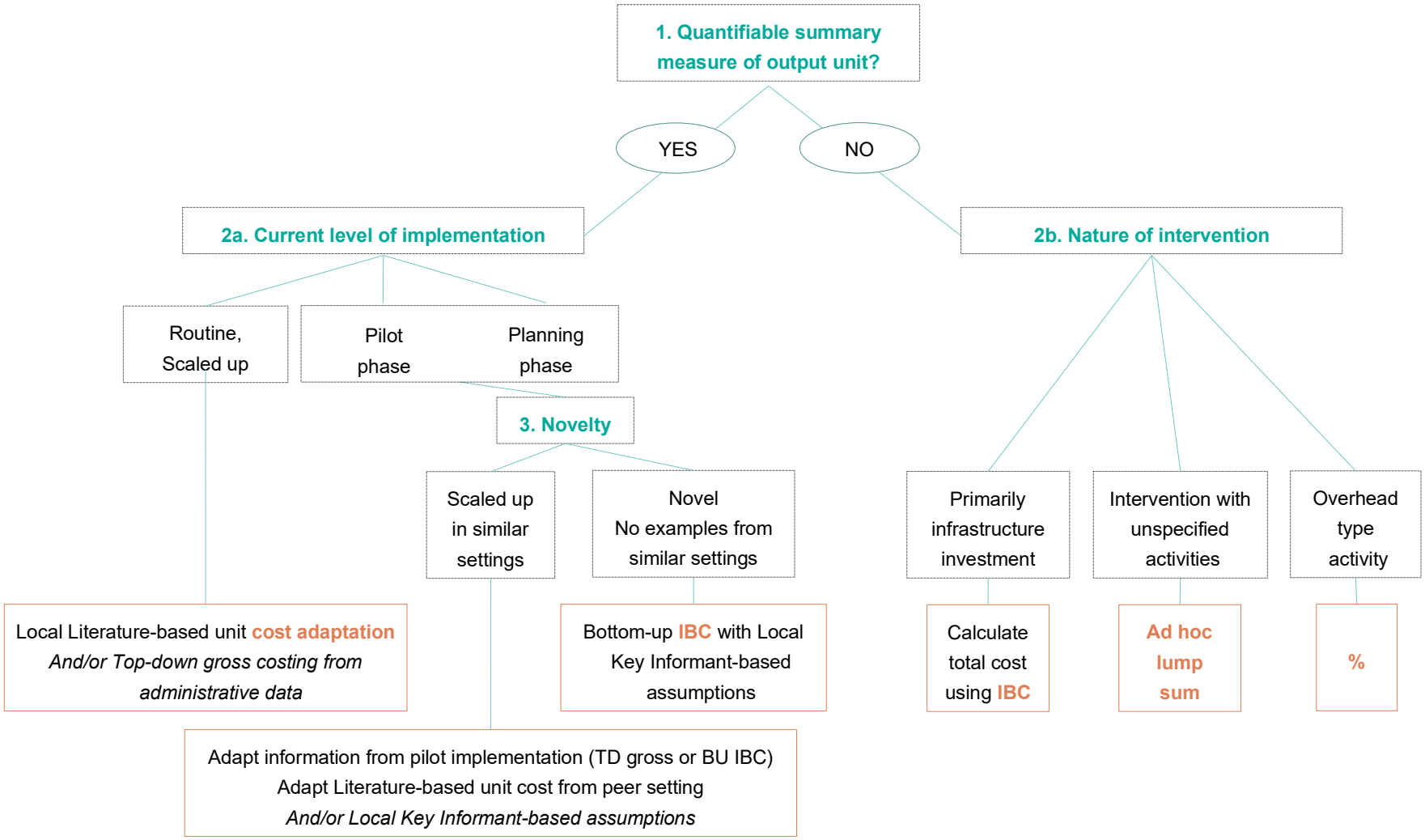
6.1. Methods for estimating intervention unit cost

Readers familiar with methods for primary costing research will recognize a wide assortment of cost measurement methods, including top-down, bottom-up, gross-costing, activity-based costing, and micro-costing. Indeed, there is an extensive set of methods for primary costing research which may not be directly relevant to the task of projecting the cost of an NSP *(1)*. These methods focus on measurement of resource use through observation of a representative sample of instances of intervention delivery, either prospectively or retrospectively. This includes the use of time and motion studies, chart review, interview, or deep analysis of administrative records on expenditure and programme output or activity-based cost allocation to assign portions of an organization's indirect costs to specific units of direct service delivery *(1)*. NSP costing exercises do make use of evidence from primary costing studies. However, the costing team will not be using primary costing research methods directly in the NSP costing exercise. Instead, the costing team will use methods for: (1) adapting previous costing research to the NSP context (adaptation approach); and (2) ingredients-based costing of interventions for which previous costing research is too limited. The costing team will also need some methods for dealing with NSP activities that lack detail for ingredients-based costing as a second-best approach, where more optimal approaches are not available.

This guide covers the main approaches to estimating intervention unit cost that work for most interventions involving some kind of direct service delivery: adaptation of evidence from existing sources, including literature and databases, on intervention cost (covered in Chapter 7), ingredients-based costing (covered in Chapter 8), and a collection of less sophisticated alternative methods (lump sum, or percentage markup) that are sometimes an appropriate last resort approach in situations where adaptation and ingredients-based costing are not possible (covered in this chapter). A decision flowchart is presented in Figure 6.1 for reference.

It is worth noting here that the term activity-based costing is sometimes used in the context of budgeting to refer to an approach similar to ingredients-based costing for estimating a pro forma cost of an intervention. In this context, an 'activity' might be a training—for example, of nursing students aimed at reducing HIV stigma. It is the training 'activity'—which might also be viewed as an intervention—that would be costed. Of course, this is very different from the similarly named 'time-driven activity-based costing' methods that health-care organizations use to allocate resources to units of direct patient care *(2, 3)*.

Figure 6.1. Flowchart for choosing an NSP intervention costing approach



6.2. Output unit

Most interventions in NSPs involve direct service delivery to a target population and produce clearly defined, quantifiable units of output. For each such intervention, the costing team needs to select a unit of output to use in their analysis. For example, adult ART is an intervention whose output is routinely measured in person-years of ART delivered. There are often a range of ways to define an intervention's output and the choice of output unit to focus on usually depends on how the NSP targets are operationalised for coverage.

For a costing exercise, one should pick an output unit that is most readily measurable and most correlated with cost variation. For example, to continue with the example of adult ART intervention, its output could also be measured in person-years of viral suppression. This output measure is more strongly correlated to health benefits like disability adjusted life-years (DALYs) and infections averted. And the proportion of patients in treatment who are virally suppressed is a good indicator of programme quality. For studies focusing on programme quality and efficiency, understanding the relationship between person-years of ART delivered and person-years of viral suppression is a priority. However, for making cost projections in strategic planning, it is more straightforward to use an output unit like person-years of ART delivered, since this unit is more readily observable and available in routine programme data. Additionally, although it is likely that downstream care costs for AIDS related hospitalizations, treating opportunistic infections, or using second line drug regimens may be higher for patients on ART who are not virally suppressed, the unit cost of delivering the ART intervention itself will not be greatly affected by the portion of patients virally suppressed. Other examples of potential output units for ART include cost per person initiated on ART, or cost per ART visit.

Sometimes, the cost per patient on ART may be broken down by patient characteristics such as monthly cost per patient in the first six months of treatment versus monthly cost per established patient; cost per paediatric patient-year versus cost per adult patient-year; cost per patient-year on first line ART versus cost per patient-year on second line ART. When reviewing available data on intervention cost, the team may come across a variety of output units. When the output unit does not match with the unit selected for the NSP projection, the costing team will have to do some work to adjust or adapt the findings in the source material to better match the unit type needed for costing the NSP (Table 6.1).

Table 6.1. ART output units

Output unit examples for ART intervention	Issues for costing
Cost per patient-year on ART	Not all patients initiated on ART remain in care. Care for new patients may have different cost than care for established patients. For a given year of clinical data, there will be some patients that do not have a full year of ART.
Cost per patient initiated on ART	
Cost per ART patient retained at one year	
Cost per patient-year virally suppressed	The viral suppression status of every patient may not be easily observable. New patients, patients with drug resistance, and non-adherent patients may not be virally suppressed. The outcome is not fully produced by the service provide as it depends also on the client behaviour.
Cost per patient-month, new patient (first six months)	Sometimes the costs of treating prevalent opportunistic infections, more frequent visits and increased laboratory testing may make patients more costly in the first months of care. Established patients may be less expensive, especially when the clinic is using differentiated care models.
Cost per patient-month, established patient	
Cost per paediatric patient-year on ART	Paediatric patients may have different treatment regimens from adults, which may be more costly
Cost per adult patient-year on ART	

For interventions that involve service delivery, the choice of costing method will depend on the availability of relevant existing primary costing research. Of course, this is most likely for routine HIV interventions that are already scaled up. A novel intervention that is in the planning phase or implemented only as a pilot test probably will not have been subjected to rigorous primary costing research.

For routine interventions, there should be a range of good data sources to inform costing. There may be published costing studies for the intervention that can be adapted. There may also be considerable local data regarding past expenditures, resources used, and intervention outputs produced to enable unit cost estimation.

For novel interventions that have been implemented in other settings, published costing research may exist. Even so, the team will rely more heavily on assumptions about how the intervention will be implemented in their setting.

In cases where existing primary costing research is not available or is insufficient for adaptation to the NSP costing, the team is advised to pursue ingredients-based costing. Working with documented information and technical experts to create a process map describing how the intervention is, or will be, delivered. Using the process map or other detailed description of the intervention, the team can conduct ingredients-based costing where the type and quantities of inputs are estimated using any documented evidence that exists and relying on expert opinion when needed.

Given the anticipated costing approach, the team will identify, locate and determine the accessibility of potential data sources. Similarly, the team will want to identify data gatekeepers,

as well as key informants with technical expertise regarding the implementation of the intervention, such as the current service provide. These can also be added to Tab 1.2. Stakeholders to keep them organized and allow for reporting of key informants in the methodological appendix.

6.3. When to use alternative costing methods

Most interventions are likely to be costed using approaches that either rely on adapting past costing studies (adaptation approach), analysis of expenditure and programme data (top down from programme level), or ingredients-based (bottom-up, from patient/unit of service level). However, in some cases, certain actions in the NSP, such as system level investments in infrastructure or personnel, may have features that require a more ad hoc costing approach. These types of strategic actions do not involve health service delivery that benefits a target population in a direct way, but rather through health systems strengthening or by addressing societal enablers which in turn allow services to function better. Examples include the following:

- Deploying point of care CD4 machines at peripheral health clinics.
- Adding a session on “removal of HIV stigma and discrimination” to pre-service training for nursing students.
- Investing in a software system for managing patient care in clinics.
- Creating new policies to increase efficiency in the procurement of medical supplies.
- Establishing systems for social contracting to increase community-led programmes.
- Activities to protect the human rights of people living with HIV/AIDS and key populations.

Calculating a unit cost may not be possible if the unit of output cannot be well-defined or if the relationship between inputs (resources) and outputs is difficult to describe. It may still be possible to estimate the total cost required for the intervention. It may also be the case that some interventions will have no net cost, or a net cost-savings. Ideally, any expected cost saving will be estimated and factored into the NSP cost projections, though these estimates are often beyond the scope of NSP cost projections.

As a general principle, it is important that budgets include line items that address strategic priorities. This can be difficult when the NSP indicates that to achieve a strategic goal, new interventions/activities will be needed, but the specific activities are yet to be determined. For example, at the time of NSP development, there may be a consensus that improving the protection of human rights for people living with HIV/AIDS is a priority, but the specific ways in which this will be achieved is not yet known. Here the relevant technical experts might be encouraged to put forward a tentative/illustrative set of interventions/activities for the purpose of costing. It is preferable to specify and cost the planned activities and interventions in a strategic area whenever possible. However, it may sometimes be appropriate to allocate a lump sum toward a particular strategic area as an indication of strategic importance, without fully operationalising the activities to be undertaken.

6.4. Tailoring the costing methods to work with modelling software

Finally, at this stage, a key consideration is whether a modelling software package such as the Spectrum Goals/Resource Needs Model, OPTIMA, Integrated Health Tool for planning and costing (the web-based successor of One-Health Tool (https://www.who.int/tools/onehealth)), will be used to forecast outcomes of the strategy over time. These models all have costing modules that typically should be used with the cost analysis to ensure that the cost estimates

are consistent with the modelled epidemiological trends, programmatic scale-up and forecasted outcomes/impacts assumed for the NSP.

The costing team will need to understand the requirements of the modelling software in advance to ensure the cost estimates are in the appropriate format. In particular, interventions on the intervention list will need to be translated or mapped to the interventions modelling software. Routine HIV interventions such as ART will usually be represented as a discrete intervention in the software package, perhaps with multiple variants for different target populations (paediatric/adult; first line/second line; female sex workers/gay men and other men who have sex with men/persons who inject drug). For example, in the Goals model, a unit cost per person-year of adult ART is a required input. Some of the interventions in the NSP may not be in the default version of the modelling software. Often, modelling software packages have ways to add custom, user-defined interventions and costing parameters. The costing team will need to work with the modelling expert to understand if and how this can be done. If the NSP includes some interventions that are not able to be modelled, the costing team will not be able to rely on the model to inform assumptions about the scale or quantity of that intervention needed and will have to develop the cost estimates separately and add them into the final cost estimates. For this, Tab 3.2 can be used to collate population coverage indicators, for example.

When using a modelling tool, the costing team (and whole NSP development team) needs to understand how the modelling software handles the connection between interventions/their costs and health impact and consider how that may affect the analyses and key messages, especially those regarding efficiency. In some models, not all interventions explicitly influence the model's forecast of averted infections, AIDS deaths, or DALYs averted. Nevertheless, in real programmes, these interventions may have an indirect impact and may be necessary to enable the realized effectiveness of those interventions for which the impact is modelled.

Having decided on the approach to be used for each of the interventions, the technical details on how to estimate unit and total costs will be discussed in the chapters that follow.

References to Chapter 6

1. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. Methods for the economic evaluation of health care programmes. Oxford: Oxford University Press; 2015.
2. Kaplan, R. S., and Steven R. Anderson. Time-driven activity-based costing: A simpler and more powerful path to higher profits. Boston: Harvard Business School Press, 2007.
3. Chola L, McBain R, Chi Y-L. Costing healthcare services using time-driven activity-based costing: A simple step-by-step guide for data collection and analysis. CGD Policy Paper 271. Washington, DC: Center for Global Development; 2022. https://www.cgdev.org/publication/costing-healthcare-services-using-timedriven-activity-based-costing-simple-step-step

Chapter 7: Collecting and adapting unit costs

Objectives

- Many interventions can be costed by referencing peer-reviewed or grey literature. This chapter provides guidance on how to search, find, critically evaluate and adapt unit costs sourced from a rapid literature review.

Methods

- Conduct a rapid literature review to identify potential unit costs for each intervention.
- Evaluate source cost suitability by considering source type, if cost is modelled or observed, costing year, geographical context, target population, activity scope and costing methodology.
- Adapt unit costs accordingly to better reflect market values and context.

Outputs

- Literature review summary.
- Adapted unit costs.

Principal actors

- The costing team.

Corresponding workbook tab

2.1. Literature review
2.2. Adaptation calculations

7.1. Sourcing relevant unit cost data

Using and adapting unit costs from the literature can be a time-efficient approach to projecting costs of certain interventions in the NSP. It saves the team time and resources required to identify and calculate the costs of individual ingredients. Indeed, that effort has already been made by previous researchers by observing, in real-time, the intervention's roll-out. If done well, that work will have captured and reported all levels of input usage, including possible inefficiencies and/or fluctuations across programme phases, thus producing a unit cost reflective of real-world practice.

There are limitations to this approach. Literature based unit costs may not be representative of the actual costs of ingredients in other contexts or settings, often because the type, quantity and price of ingredients will differ. For example, commodity prices may fluctuate over time, and salaries for human resources vary depending on context. Furthermore, interventions vary widely in approach and delivery methods, may or may not include auxiliary activities, such as demand generation or quality assurance measures, and employ different types of resources. Moreover, the accuracy of a literature-based unit cost ultimately hinges on the quality of the research conducted and its source materials. Additionally, unit costs can vary significantly depending on the type, size and population served by interventions, which in turn influences economies of scale. For example, the cost per person tested in South Africa may differ greatly from Eswatini

due to differences in population sizes, the scale at which interventions are implemented and the efficiencies that larger scale programmes can achieve. Therefore, when using this approach, it is important to consider the limitations and potential biases of the literature sources and adapt the costs accordingly to improve accuracy of the final estimate and ensure it is appropriate to the new setting.

This chapter reviews how a costing team may critically evaluate their sources and appropriately adapt unit costs to their specific contexts and needs. Moreover, the chapter introduces workbook tabs 2.1 and 2.2 in which the literature review and adaptation work can be conducted and, importantly, documented. It is crucial that the team transparently report their sources and keep records of any adaptations and assumptions made, as this will allow quality checks, but also support future efforts to transfer costs across settings and contexts.

7.2. Searching the literature

When searching the literature for relevant unit costs, it is important to be efficient and focused due to the team's time constraints. While a systematic literature review is the gold standard for this type of research, a rapid review can still yield valuable results. To begin, the team can refer to the Global Health Cost Consortium (GHCC) Unit Cost Study Repository *(1)*, a tool specifically designed to support NSP costings and organized along interventions, countries, delivery platforms and intervention characteristics. The repository includes a wealth of relevant cost data from a variety of sources and can be a valuable starting point. The team may also want to search for published systematic reviews on the costs of specific interventions, thus leveraging the exhaustive work already conducted by another researcher and rapidly identify relevant sources and costs. Finally, UNAIDS is presently building the NSP Costing Repository, hosted on the UNAIDS Financial Dashboard (UNAIDS HIV Financial Dashboard), in which former and ongoing NSP costing reports and worksheets will be compiled. This repository will allow the team to cross-reference sources used in other country NSPs, thus helping to avoid a duplication of effort, and expediting this step.

Not all costing sources will be from published peer reviewed studies. While the team conduct a desk review of published studies, they may, in parallel, investigate other in-country grey literature sources. This may include former NSPs, National AIDS Spending Assessments (NASAs) investment cases, PEPFAR country operational plans, Global Fund funding requests, national cost models, internal reports and unpublished studies. These sources are particularly useful in that they can provide contextually relevant data. However, they are not always transparent, and they often require additional investigative work. It is insufficient to copy/paste the unit cost used in a former NSP or investment case without understanding that cost's primary source, ingredients, activity scope and underlying assumptions. This could lead to using unit costs that do not properly reflect the resources required to achieve the NSP's intended objectives. For example, a unit cost sourced from a different country where wages may be higher or lower needs to be properly adjusted to account for salary differences. Additionally, the source unit cost may only consider the incremental cost of an intervention, which would not be appropriate for projecting the costs of a full stand-alone intervention, especially if the intervention is in the start-up phase or a mature intervention, or if economies of scale are a factor and the scales are very different. While these sources may serve as useful references and starting points, the team is cautioned from using them indiscriminately, especially if they are not accompanied with ingredient and activity level details.

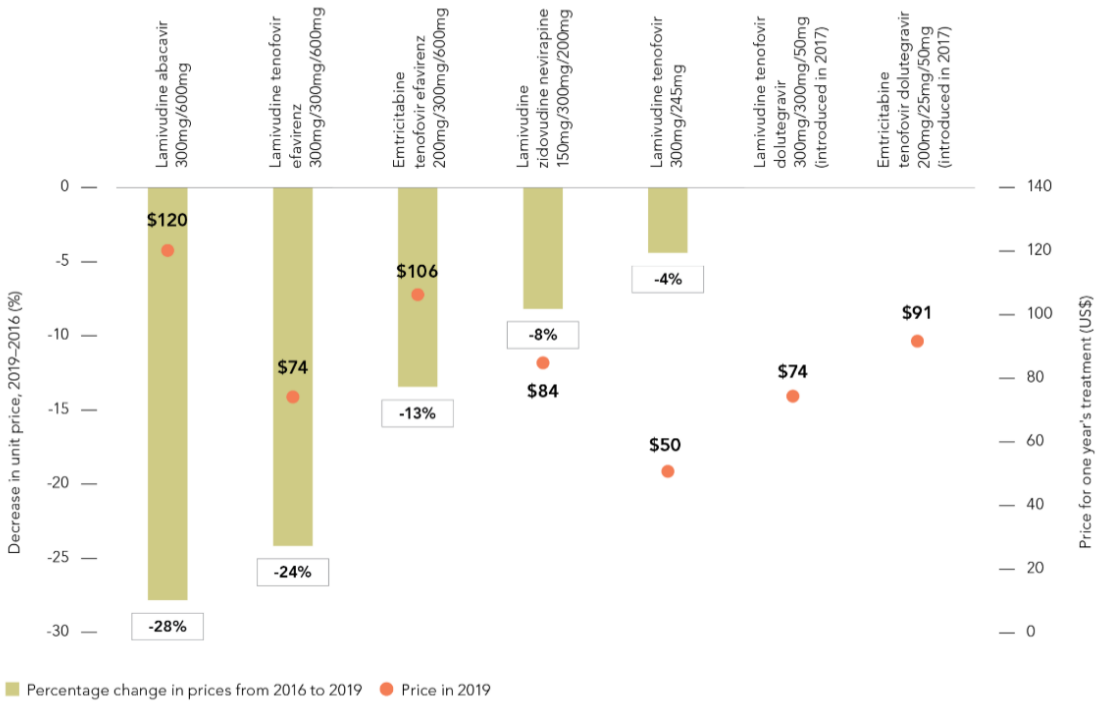
7.3. Evaluating suitability

After conducting a rapid literature review, the team will have a range of different sources and unit costs for each intervention. Their next step is to identify which unit cost will be the most appropriate for the intervention they are aiming to cost. To do this, the team will need to critically evaluate each cost source to gauge suitability and identify potential limitations and/or areas that may need adaptation. To be clear, most sources will not perfectly match the NSP's intervention, context or setting. Unless the source is a peer-reviewed study of the observed costs of that intervention from the same country and includes the same activities, some form of adaptation will be required. At a minimum, the team will need to adjust prices for inflation. In other cases, the team may be required to re-evaluate and adjust input quantities or prices.

To evaluate suitability of source costs, the team should consider the following characteristics:

- **Type of source:** Is it published, peer reviewed literature or grey literature? As stated above, peer reviewed literature is rigorous and more transparent in regard to methodology, activities, ingredients and study limitations. Grey literature can provide valuable insight, especially if published data are scarce. This is especially true for certain programme areas where published costing literature is lacking, such as societal enabling interventions (for example, human rights advocacy, gender-based violence prevention programmes, interventions addressing stigma and discrimination), innovative services that have not yet been extensively implemented or studied, programme support functions (for example, human resource capacity building and laboratory quality assurance).
- **Modelled versus observed costs:** The team should consider whether the cost estimate is based on observed costing or modelled ingredient-based costing. As previously mentioned, observed costings are usually based on actual resource use and effectively capture the real, often less than optimal, levels of resource use. For that reason, however, they are significantly context driven. Conversely, ingredient-based costing is done by modelling the presumed resources required to deliver an intervention, often in optimal conditions and are more subject to assumptions than real-world implementation, where inefficiencies are present.
- **Costing year:** The team must consider the year in which the data were collected for the costing source. Intervention costs will vary over time due to changes in prices, wages, or technology. Significant changes in HIV programmes have occurred over the last ten years alone, including, for example: the roll-out of the universal 'treat all' or 'test and start' approach; the development of new and more affordable ART regimens (see Figure 1); the introduction of point of care (POC) technologies; HIV self-testing (HIVST); and PrEP. Figure 7.1 presents ARV price reductions from 2016 to 2019; however, more recent data suggest that prices have declined even further since then. As a rule of thumb, primary sources that rely on data ten years or older are probably (and regrettably) no longer relevant.

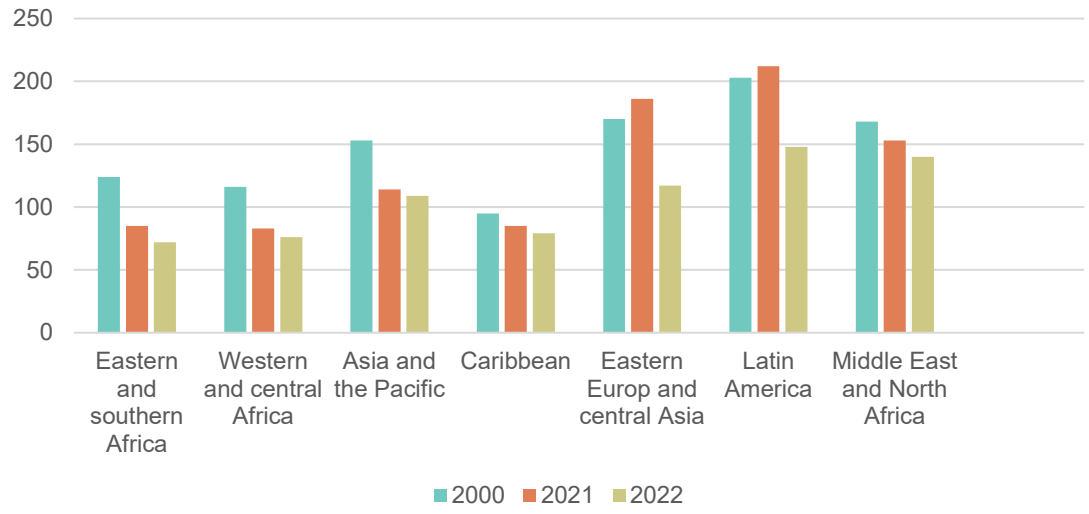
Figure 7.1. Percentage change in prices of antiretroviral medicines from 2016 to 2019.



Source: UNAIDS Global AIDS Update, 2020.

- **Geographical context:** Was the source costing conducted in a similar country context to the intervention being costed? Country context will have a significant impact on costs due to differences in wages, infrastructure, health-care systems, availability of resources and uptake. A look at the limitations section in a published, peer reviewed study (often the penultimate paragraph in the discussion) will show that authors often note that their study results are not generalizable to other contexts and may provide examples or further details. If the source is from the grey literature, for example, the United States Medicare Fee schedule, this would not be appropriate for projecting the costs of an intervention in sub-Saharan Africa. Figure 7.2 provides an example of the significant price differences for ARVs across geographical regions. Thus, using source costs from a similar country context can help ensure that cost estimates are congruent and relevant. The most common indicators that can help the team rapidly assess suitability are geographical region, HIV epidemiology and country income level.

Figure 7.2. Average procurement prices (in US dollars per person-year) or antiretroviral medicines by region, 2020–2022



Source: Economist Impact, 2023.

- **Target population:** For similar reasons as stated above, an intervention's target population will also affect costs. Population characteristics, such as age, gender and socioeconomic levels, will indirectly affect preferences and service utilization patterns, thus affecting final unit cost estimates as well as any conclusions on cost effectiveness. Thus, cost estimates from an intervention targeting, for example, prison inmates, will not be generalizable to an intervention targeting the general population. It is thus advised to consider, at minimum, the population category (general population, key population, youth, etc.) of the source data and determine whether this corresponds to, or significantly differs from, the intended target population of the intervention being costed.
- **Activity scope:** The costs of interventions will differ depending on the specific activities involved. Indeed, the team reviewing a list of different cost sources for a single intervention will often find significantly different unit costs—due principally to differences in activities and operational roll-out. For example, comprehensive sexuality education can cost anywhere between $10 to $200 per youth reached, and this can be due to the type of provider delivering the service, the number of modules included in the intervention, the level of training given to providers, the delivery platform, etc. Thus, when a team finds significant variations in unit costs between different sources, they are urged to further investigate the scope of activities for each of their sources and evaluate which may be most congruent to the intervention being costed (Box 7.1).
- **Included inputs:** Unit costs can differ widely depending on which cost inputs are included. Some sources may report only the price of commodities (e.g. drugs or test kits), while others may include additional inputs such as supply chain and logistics, service delivery costs (e.g. staff time, transport), and even central or overhead costs. It is therefore critical to assess whether the unit cost you are referring to includes all the necessary inputs you want to include in your estimate. This can be particularly challenging when relying on grey literature, where such details are not always transparently laid out. In such cases, the team are strongly encouraged to reach out to the original authors to clarify what inputs have been included and excluded.

Box 7.1. Currency and output units

The team should pay attention to both the currency and output unit of their source costs. Variations in unit costs for a single intervention may be simply due to differences in reporting. For example, the cost of comprehensive sexuality education (CSE) can be $25 per youth reached or South African R700 per teacher trained, with differences in both the currency and output units. Comparisons should therefore be between equivalents. Conversions needed to align currency and outcome measure before allowing valid comparison.

- **Costing methodology:** Finally, does the source costing methodology match the NSP's costing purpose? Specifically, the team should verify if the source unit cost is financial or economic, full or incremental (see Chapter 3 or the Glossary for an explanation of these terms), and ensure this corresponds to their costing needs (Box 7.2). For example, in projecting the costs of distribution of male condoms and lubricants, should the unit cost only capture the cost of commodities alone? This may be relevant if condom and lubricant distribution is incrementally added to an already existing education programme. Should it capture the full financial cost of peer delivery services and distribution? Or perhaps, the country is looking to pay for peer distributors rather than rely on their volunteered time, in which case the cost should capture the full economic cost of the service. The answer to these questions will depend on the costing scope and purposes that were defined in Chapter 3. At this stage, the team must ensure that source costs align with the NSP costing's defined purpose.

Box 7.2. Differences between financial and economic, full and incremental costs

Financial costs only include financial expenditures, while economic costs include opportunity costs of all the resources used. Full costs mean all resources used are costed, while incremental costs only measure the additional resources used compared to a baseline service.

Using the example of condom and lubricant distribution run by the NAC, the measurement of costs will vary depending on methodology and purpose.

See Chapter 3 or the Glossary for definitions and a review of costing methodology terms.

	Financial	Economic
Incremental	Only the cost of commodities and distribution purchased by the National HIV/AIDS programme.	Cost of commodities purchased by and provided in kind to the National HIV/AIDS programme.
Full	Cost of commodities AND cost of the peer education services supporting the distribution as well as any shared and indirect costs such as overall programme management financed by the National HIV/AIDS programme.	As full financial, plus the opportunity cost of: volunteers providing their time and services in-kind, including their own transport used in the distribution.

Once the team has critically evaluated each of their source costs using the criteria listed above, they will be left to make a final decision on which sources may be most suitable to use, and what they may need to adapt.

There is no hard rule on judging suitability. The team must often make do with what is available to them - and that, in turn, is often limited and flawed. The criteria above should be used as

guidance and not a checklist. The goal is for the team to be able to justify the use and adaptation of the best available source cost. If the team finds that source data diverge too strongly from the intervention they are seeking to cost, they may then opt to model the cost themselves by doing an ingredient-based costing. In that case, they should refer to the next chapter. For all other unit costs, the team may proceed to applying the adaptation approach.

7.4. Adapting unit costs from the literature

For unit costs that do not directly match the desired outcome measure or apply to the context, the team can adapt the unit cost to better fit their specific needs. One basic adjustment that the team will usually have to make is accounting for inflation. Simply put, inflation impacts the value of money over time, so that unit costs measured from previous years will not have the same value today. Thus, adjusting for inflation helps ensure unit costs used are reflective of current market values.

Kumaranayake *(2)* or Turner *(3)* provide guidance on how to accurately adjust cost data to account for inflation. A brief example using the Kumaranayake method is provided in Box 7.3. Note that there is a third method, where tradeable inputs (e.g. drugs, equipment and vehicles) and non-tradeable inputs (e.g. human resources and buildings) are each adjusted for inflation separately. This method is more suitable for ingredient-based costing, as described in Box 8.1 in Chapter 8.

Box 7.3. Adjusting a unit cost for inflation

To adjust a general unit cost for inflation, the Kumaranayake method *(2)* serves as a rapid and widely accepted approach. This method uses the US dollar GDP deflator to adjust costs when dealing with a mix of tradeable and non-tradeable inputs.

The key points include the following:

- Tradeable costs. Items purchased internationally (e.g. medical commodities, equipment), are influenced by global trends and should be inflated using the US dollar GDP deflator.
- Non-tradeable costs. Items acquired locally (e.g. salaries, rent), are affected by domestic inflation and should be adjusted using the national consumer price index (CPI).
- Recommended and simplified approach. When inflating a general unit cost (that includes a mix of tradeable and non-tradeable inputs) without a breakdown, use the US dollar GDP deflator for the entire cost. For further explanation of the more precise method of inflating each type of ingredient, see Box 8.1.

Worked example:

A study reports the cost of an intervention delivered in Rwanda in 2020 as US$ 100 per person. The team needs to adjust this to 2025 US dollars using the GDP deflator.

Step 1: Gather the data. Consult the World Bank's database and look for the https://data.worldbank.org/indicator/NY.GDP.DEFL.ZS?locations=US (base year varies by country) for the USA between 2016 and 2021. Suggestion: Download the Excel file from the World Bank's database. Open the file and navigate to the Data tab. Locate the row for the USA and refer to the columns for the years 2020 to 2025 to retrieve the required values.

- Base year cost: US$ 100 per person.
- US dollar GDP deflator for 2020: 100.95.
- US dollar GDP deflator for 2025: 113.25.

Step 2: Use the formula:

- Adjusted cost = base year cost x GDP deflator index for target year / GDP deflator index for base year.
- Adjusted cost = 100 × 113.25/100.95 = 100 × 1.12.
- Adjusted cost = US$ 112.18 (2021).

The cost of the intervention in 2021 US dollars is approximately $112.18 per person. This accounts for cumulative inflation from 2020 to 2025 using the GDP deflator.

In addition to adjusting for inflation, the team may need to adapt unit costs to different output units or outcome measures. In an example already provided, the cost of comprehensive sexuality education can be expressed by the cost per youth reached or cost per teacher trained, to name but a few. In the current case, the team may have been informed by the TWG that in this new NSP, the target will be to reach 5000 youths per year, in which case the cost per youth reached will be appropriate to use. However, in this hypothetical scenario, the team only has at their disposal the 'cost per teacher trained'. They must use an appropriate conversion factor (see Box 7.4 for a worked example).

Box 7.4. Adapting a unit cost's outcome measure

A study reports the cost of a comprehensive sexuality education programme as US$ 50 per teacher trained. However, the team needs to convert this to cost per youth reached, as the model being used will then multiply that unit cost to the target quantity of 5000 youths reached per year. To do this, the costing team follows these steps:

First, the team needs to determine the relationship between the unit cost and the desired outcome measure. In this scenario, the team needs to estimate how many youths may be reached, on average,

per teacher trained. They can do this by conducting interviews or reviewing programmatic reports, or published studies. Here, the team finds that 50 teachers were trained, and a total of 5000 youths were reached, meaning the programme reached an average of 100 youths per teacher trained.

Next, the team converts the unit cost by dividing the original unit cost by the estimated ratio. In other words:

$$\frac{50\ per\ teacher\ trained}{100\ youths\ reached\ per\ teacher\ trained} = 0.50\ per\ youth\ reached$$

If original costs were reported in a previous year, the team adjusts the new unit cost ($0.50 per youth reached) for inflation following the steps listed in Box 3. For the sake of brevity, assume here that the original costs were reported in the current year.

In conclusion, the CSE programme originally estimated at $50 per teacher trained is estimated to cost $0.50 per youth reached.

Another type of adjustment may occur when the team wants to calculate a single average cost but has different cost values, each with different levels of importance or weight. In this case, the team needs to calculate a weighted average, which will give them an overall estimate that reflects the significance of each cost component in the total. Weighted averages are commonly used in cost analysis, such as estimating the average cost per person tested from the cost per person tested positive and per person tested negative. Another common example is the average cost of ART, between first- and second-line treatment. A worked example is given in Box 7.5.

Box 7.5. Calculating a weighted average

A country conducts a national cost analysis with a representative sample of 2400 ART clients. They estimate that, last year, first line ART treatment cost about $250 per patient. Second line ART was considerably more expensive, at $750 per client. Out of the 2400 clients in the sample, 2250 (94%) were receiving first-line treatment and 150 (6%) received second-line treatment. The weighted average is therefore:

$$94\% * £250 + 6\% * \$750 = \$281.25 \text{ per client}$$

This same calculation can also be expressed as:

$$\frac{(2250 * \$250 + 150 * \$750)}{2400} = \$281.25 \text{ per client}$$

Example adapted from a United States Agency for International Development funded health, finance and governance study on the costs of ART in Botswana *(4)*.

The team may need to adapt specific ingredients in unit costs to account for fundamental differences in resources and prices. This will depend on the team's findings when evaluating source suitability. For instance, if the original unit cost was estimated in a very different context, where the costs of materials or labour are significantly different from where the intervention is now being costed, the team will have to adjust these ingredients to reflect appropriate values in the new context. This is particularly pertinent when applying unit costs from, say, a PEPFAR COP project to a publicly operated programme, where salary scales and overhead costs will be quite dissimilar (see Box 7.6 for an example).

Box 7.6. Adapting a unit cost's ingredients

A study reports the cost of door-to-door community-based distribution of HIV self-testing in Malawi *(5)*. However, since the study was published, the price of HIV self-test kits dropped from $2.40 to (hypothetically) $1.00. The team wants to adjust the unit cost, originally reported at $8.15 per kit distributed, to reflect the recent drop in price of the kits. To do so, the team follows these steps:

1. First, the team identifies the original cost of the commodity. In this case, each kit costs about $2.40.
2. The commodity is now priced at $1.00.
3. The team calculates the percentage change in the commodity cost:

$$\frac{\text{new price} - \text{original price}}{\text{original price}} * 100 \text{ or in this case } \frac{1.00 - 2.40}{2.40} * 100 = -58.3\%$$

4. The team then refers to the study's cost breakdown and identifies what portion of the total costs was attributed to the kits themselves. In this study, the author notes that the cost of kits contributed to 34% of total costs in Malawi. So, of the total unit cost of $8.15 per kit distributed, 34%, or $2.77, represents the cost of the commodities themselves, and the remaining 66%, or $5.38, represents the cost of all other ingredients.
5. The team applies the percentage change to the commodity cost: $2.77-($2.77 * 58.3%) = $1.16.
6. They add this new estimate to the other ingredients, which remain unchanged: $1.16 + $5.38 yields $6.53.

In conclusion, the new estimated unit cost of the intervention, accounting for a hypothetical price drop in HIV self-testing kits, is $6.53.

Note: It is not as simple as subtracting the difference in costs from the unit cost per kit distributed, because $2.77 also captures a share of wastage due to expiration, loss, use in demonstrations, etc.

Finally, the team may adjust unit costs based on the scale of an intervention. Now, this is not easily done and can become quite complex and sophisticated using statistical analyses. In NSP costings, this may not be feasible. Nonetheless, adapting unit costs to scale can be particularly useful, for example, when a successfully run pilot project is selected for national implementation. Merely multiplying pilot unit costs with national targets does not consider variations in fixed and variable costs, including start-up expenses. Furthermore, larger interventions benefiting from economies of scale can reduce average costs per unit by spreading shared fixed costs over a larger client base and enhancing resource use efficiency. Unit costs may also rise again at very high coverage due to, for example, challenges in reaching very high coverage, think of geographic area or differences in health seeking behaviours.

For an NSP costing, the recommended approach to 'roughly' adjusting unit costs by scale is to once again rely on and leverage the work of experts. See Box 7.7 for an example.

Box 7.7. Adjusting costs for scale

Since 2016, HIV self-testing (HIVST) has been implemented globally as part of a package of differentiated HIV testing approaches. In 2021, a multicounty study looked at the costs of integrating HIVST into 23 community-led programmes for key populations. In this study, the authors modelled costs for programme transition and early scale-up. In Senegal, the study estimated the cost of distributing HIVST kits to female sex workers at $17, to gay men and other men who have sex with men at $27, and to people who use drugs at $144. At scale-up, the average cost reduced to $13 for female sex workers, $23 for gay men and other men who have sex with men, and $50 for people who use drugs.

This predicted reduction in unit costs was estimated by considering the fixed and variable costs at different levels (local, subnational, national and international). Examples of fixed costs are HQ buildings and national management; these might need little expansion. Inputs like training can be considered as semi-fixed costs because the preparation and delivery costs of the training are largely fixed regardless of the number of trainees (scale), but the per diems for participants are variable.

However, fixed costs at different levels, district, regional and national, are likely to not need scaling up at the same pace as outputs. Either historical data on changes to inputs and outputs can be used to estimate the relationship between fixed costs and outputs, or assumptions informed by programme implementer knowledge can be used to estimate the additional costs that would be needed to support larger scale programmes.

Variable costs, in contrast, increase proportionate to the level of output achieved, i.e. the number of people undergoing HIVST will be a key driver of the cost of test kits and distributor costs. Unit variable costs are thus multiplied by projected output.

These projected total fixed costs are then added to the projected total variable costs (unit variable costs × output) to estimate the total costs and divide all by new quantity for a new unit cost. As the (near) fixed costs are spread over more units of output, economies of scale are expected, i.e. reducing unit costs in larger programmes. However, some interventions, like testing, may experience increasing costs with scale (i.e. diseconomies of scale), where the keen testers have already been tested. This leads to fewer undiagnosed cases among people living with HIV, and larger numbers of people needing to be tested to achieve the same ultimate health impact.

When using an ingredient-based or activity-based costing methodology, where the analysis starts with activities, such as training or meetings, economies of scale will be captured because activity-based costing estimates do not directly vary by unit of output, and have some fixed or semi-fixed costs, regardless of the number of kits handed out by each distributor. The unit cost per kit distributed will thus go down with more kits distributed.

For a more detailed example, see d'Elbee et al. *(6)*.

7.5. Using expenditure data from NASAs to estimate and adapt unit costs

The National AIDS Spending Assessment (NASA) is an approach that countries apply to track all financial expenditures related to HIV interventions in a country. NASA captures the expenditures of all service providers involved in the HIV response in the country—both recurrent and capital—on specific HIV interventions, disaggregated by production factors (cost items) and funding sources. Unlike micro-costing studies, which estimate costs for specific facilities or populations, NASAs provide an aggregated national perspective, making them a valuable tool for estimating and adapting unit costs.

While NASAs typically present a country's total spending per intervention, recently they have also included some unit of expenditure per output for specific interventions with discrete output measures. Expenditures are divided by a corresponding national-level service output thus deriving an annual average unit of expenditure per output. This unit cost reflects the nominal U.S. dollar value in the year of expenditure and is not typically adjusted for inflation, except in historical trend analyses. The costing team should thus leverage NASA data to:

(1) Obtain unit costs for specific interventions and program areas. NASA data are derived from a country's service providers' historical expenditure records, providing a reality-based reference point for unit costs that account for large-scale program delivery, averaged across different modes of delivery and different implementation sites, as well as different financing sources. The NASA collects the most recent closed financial year/s, and thus

the expenditure data would be two or three years old (or older, depending on when the assessment was undertaken), in which case the costing team must adjust for inflation to the costing period of the NSP.

(2) Identify cost trends over time. Since NASAs typically cover multiple years, they allow for an analysis of cost trends, which is crucial when considering the effects of scale-up and efficiency-gains over time. The NSP costing team can use these trends to inform their assumptions of changes in unit costs over the NSP period, as it is unlikely that unit costs will remain constant over that period, for many reasons.

(3) Assess economies and diseconomies of scale. Some interventions, such as ART treatment, may experience cost reductions as coverage expands due to economies of scale. Conversely, programmes such as VMMC may become more expensive over time due to high fixed costs and a reducing population coverage who still need to be circumcised. Historical NASA data can inform cost projections by accounting for these scale effects.

The team is strongly encouraged to use NASA data to help inform its work. However, as with all data, the team should take care to consider several factors to ensure their appropriate application:

- **Comparability with NSP estimates.** NASA data do not always include all possible shared costs, meaning that unit of expenditure derived from NASAs will be slightly lower than unit costs of those estimated in NSPs.
- **Validation of cost components.** The team should check whether all expected cost items are included in the NASA's units of expenditure. If necessary, additional shared or missing costs (e.g. Ministry of Health operational expenses) should be estimated and added. The assumptions and limitation sections in the NASA report should indicate if some shared costs were estimated or omitted, and the costing team should take these into consideration and adjust, as needed. For example, if the NASA report indicates that a share of the salaries of health-care professionals working at primary health-care level could not be attributed to specific HIV services, the costing team should attempt to add an estimate of these to the unit of expenditure provided in the NASA report.
- **Adjustment for inflation and expenditure year alignment.** If the NASA data are from past years, inflation adjustments should be made to reflect current costs. The expenditure year should also match the performance indicator year used in the unit of expenditure calculations.
- **Accounting for capital investments.** A NASA records capital expenditures in the year of the transaction rather than annualizing them. This can artificially inflate unit costs in years with major capital investments. The team should determine whether and how to smooth for these expenditures.
- **Quality control and interpretation.** The team should carefully review the assumptions and limitations sections of NASA reports before using the data. If uncertainties arise, consulting UNAIDS' resource tracking team can help assess data reliability.

By integrating NASA-derived units of expenditure into NSP costings while considering these caveats, countries can improve the accuracy of their expenditure estimates. Countries that have leveraged and used NASAs to inform their estimates have found that final estimates better resembled real-world expenditures, leading to improved resource planning and allocation. This, in turn, supports better resource allocation, financial planning, and advocacy for sustainable HIV financing.

References to Chapter 7

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Chapter 8: Constructing unit costs from ingredients

Objectives

- This chapter provides guidance on constructing unit costs for interventions using the ingredients-based costing (IBC) method when empirical data on resources are not adequate. It outlines how to create detailed estimates of an expected unit cost for an intervention based on assumptions and expert input.

Methods

- Unlike micro costing, which meticulously tracks actual resource consumption in various instances, IBC estimates the cost by identifying and quantifying the necessary inputs, or 'ingredients', required to deliver an intervention. This approach involves consultation with experts to understand the intervention and create a process map, identify the type and quantity of required resources, and calculating their costs to estimate an average unit cost for the intervention.

Outputs

- A list of common inputs ('ingredients') used in multiple interventions to ensure consistent assumptions about input prices.
- Process maps of intervention delivery.
- 'Recipes' describing how the unit cost of each intervention was calculated using IBC.

Corresponding workbook tab

2.3. IBC recipes.
2.4. IBC common ingredients

Principal actors

The costing team. Responsible for conducting the IBC, including creating process maps, estimating resource use, and calculating costs. They work closely with domain experts to ensure the accuracy and applicability of the cost estimates.

8.1. Introduction

An NSP costing exercise should be informed as much as possible by empirical data measuring the actual cost and quantity of resources used to produce the intervention output. As discussed in Chapter 7, primary costing studies in which an intervention's actual resource utilization was measured often report intervention unit costs that may be adapted for use in an NSP costing exercise. Alternatively, an NSP costing team might have access to sources of empirical data on actual resource use, such as programmatic reports or administrative records which might be suitable for making a rough top–down calculation of intervention unit cost. When there is no unit cost to adapt, and data are not available to generate a top–down unit cost, the remaining approach available to an NSP costing team is modelling intervention cost using the IBC method.

This method builds up a cost from ingredients which are the resource inputs necessary to produce the intervention output. It offers flexibility regarding the definition of ingredients. They

can be commodities like doses of vaccines, or activities like training sessions that themselves are composed of several microlevel inputs. In fact, IBC is sometimes also called ‘activity-based costing’ since ingredients can also be activities that comprise an intervention. IBC can even be used to generate the total cost of an intervention without dividing its output into units. Another advantage of modelling cost with IBC is that it can accommodate the use of assumptions in place of empirical quantitative data.

IBC is an obvious choice for novel interventions that are not yet scaled up. But it is also useful when the observed implementation of the intervention is not being provided at good quality or at an efficient scale. In these situations, the observed cost will not reflect the resource use of a well implemented, efficiently delivered service. Using IBC to model costs based on normative guidance may be more appropriate and is not uncommon. A helpful resource for this type of cost modelling is the WHO UHC Compendium database which translates WHO guidelines for intervention delivery into resource requirements. Additionally, in the costing module of the integrated health tool, a normative set of ingredients are listed as the default starting point for intervention costing, but users can adjust these and replace them with either empirical data or adjust the normative assumptions to reflect the local setting more accurately.

8.2. Differences between IBC and micro-costing

While IBC is a bottom–up technique, it is not micro-costing. In both IBC and micro-costing, one should include all the resource types consumed in the production of the intervention. However, a micro costing study is primary costing research that observes and measures (prospectively or retrospectively) actual resource use in a representative sample of instances of intervention delivery and captures variation in resource use across instances of intervention delivery. A micro-costing study may include an exploration of ‘drivers’ or ‘determinants’ of cost, including variations in practice that deviate from protocol. In contrast, IBC is a more ‘quick and dirty’ modelling approach concerned with approximating resource use for a typical ‘per protocol’ instance of intervention delivery. While IBC based estimates do not capture real-world variation in resource use, they are usually adequate for high-level strategic planning. IBC should make use of what empirical evidence is available but will often require assumptions informed by experts to fill in data gaps.

8.3. Steps for carrying out IBC of an intervention

To complete an IBC for an intervention, the team will need a granular understanding of the intervention, including how the intervention works, what is needed to deliver it, how much each input costs, and at what scale it will be delivered. More specifically, the costing team, with the help of a technical expert, will need to do the following:

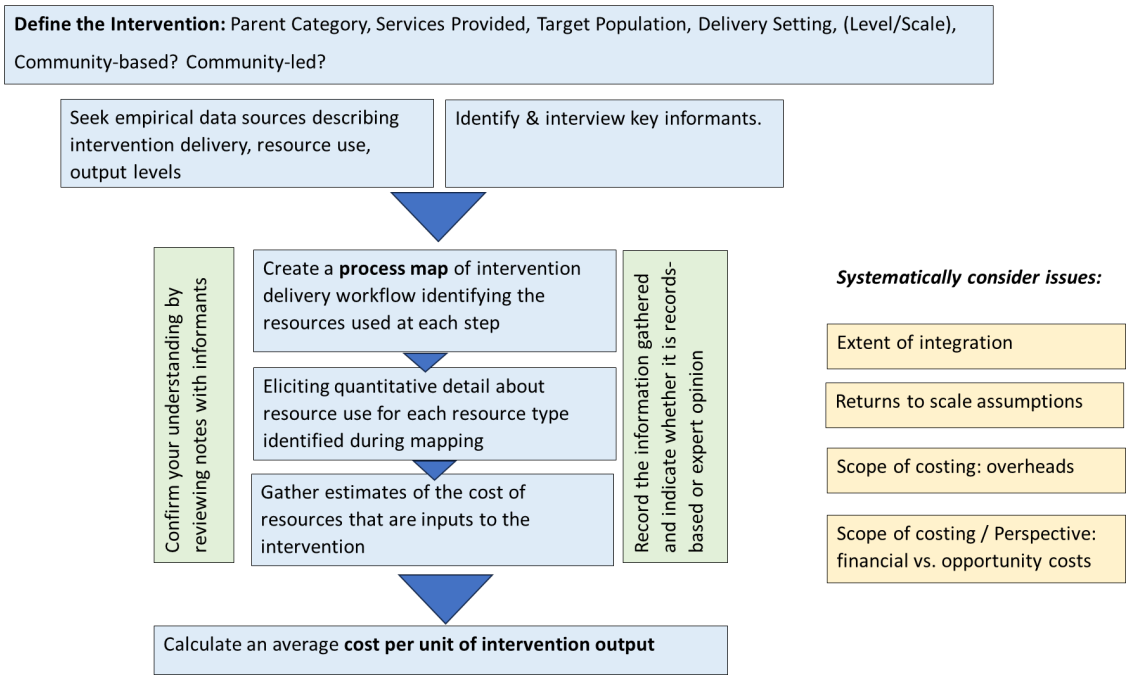
(1) Create a process map that represents the logic of intervention delivery (e.g. as a flowchart of activities).
(2) Following the logic of the process map, identify the type of resources (i.e. the ingredients) required by the activities of the intervention.
(3) Understand the scale at which the intervention will be implemented during the NSP time horizon.
(4) Choose a quantity of intervention delivery to use for resource estimation.
(5) Define a unit of intervention output for which a unit cost is to be estimated.
(6) Estimate the quantity of those ingredients required to produce a specific quantity of intervention output.
(7) Locate information on the current market price per unit of input resource.

(8) Calculate the total cost for the intervention by multiplying the quantities of resource required by the unit price.
(9) Divide the total cost by the quantity of intervention output to obtain an average cost per unit of intervention output.

Essentially, the costing team must create a recipe for how the intervention is made from ingredients. Like a recipe for cooking food, the recipe for the intervention will list the necessary quantities of ingredients required to produce a certain amount of intervention output. As with food recipes that may be divided into sections for different parts of the dish (pie crust and filling), so too can interventions consist of activities. As with cooking, the processing of an intervention's ingredients usually requires the use of equipment, buildings and energy, and these are also considered inputs that have a cost that should be counted, though in some cases they may be reported separately or assumed to be available and omitted from the calculation of the interventions' direct cost. The costing team may find the recipe for an intervention in written protocols, such as a research protocol for a pilot study, a standard operating procedure document (e.g. for laboratory tests), or a government or implementer's guide to the intervention, or WHO guidelines. However, if the intervention's recipe has not been previously documented, the costing team will need to construct the recipe, working with experts who know the process by which the intervention was (or will be) implemented. In most cases, the costing team will need to find key informants to provide domain expertise and confirm the reasonableness of costing assumptions.

Figure 8.1 shows the costing team's IBC workflow, starting with a well-defined intervention. Prior to receiving an intervention description from the NSP TWGs, the costing team may refer to country guidelines, such as the HIV treatment protocol, to develop draft intervention descriptions that can be refined as more details become available. Using available information and expertise from key informants, the costing team will create a process map for the intervention delivery, iteratively adding detail regarding the types of input resources used, the quantity of those resources used to produce the intervention, and the monetary cost of those resources.

Figure 8.1. Overview of steps for IBC



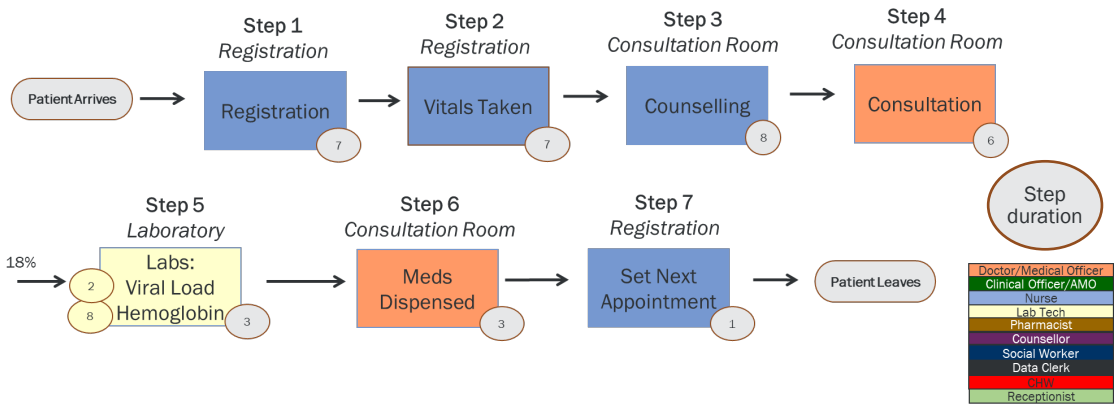
Wherever possible, documents should be sought to support IBC costing assumptions, even when relying in part on expert opinion. Throughout the IBC process, the team should be recording what they learn in an intervention IBC costing template and periodically reviewing what they have learned with key informants and the stakeholder working groups for validation.

The ingredients required can be identified by interviewing technical experts with knowledge of how the intervention is implemented and delivered. In some cases, there may be documents (such as clinical practice guidelines, intervention protocols, or implementation plans) containing information that help identify and quantify the required resources. If several different interventions use the same type of inputs, the costing team should consider making a list of common ingredients to refer to when building recipes. This can save time and improve the consistency of input prices.

During the resource identification step, it can be helpful to construct a process map that breaks the intervention down by activities or phases and then identify the type of resources used in each part of the intervention. The ingredients directly used to produce an intervention typically fall into helpful categories such as staff, consumable items such as medicines, syringes, test kits, fuel etc, other operational costs and capital such as laboratory machines, refrigerators, exam rooms and vehicles. There could also be some system level indirect cost for activities like programme management or supervision/monitoring that could be allocated down to the intervention level, or which may be counted separately in the NSP costing exercise. If the intervention is new, there may be one-time costs associated with a ‘start-up’ phase such as training and social mobilization which involve ingredients such as labour, printing, venue rental, travel, meals, billboards and radio/TV spot production.

Figure 8.2 shows an example of a process map for a routine HIV treatment clinic visit for a stable HIV patient. In this example, the logic of the intervention is broken down into a set of chronological steps from patient arrival to departure. At each step, the process map has identified the type of staff involved and the number of minutes of labour for each step. After totalling the total minutes for each of the labour categories, the costing team used an average wage for each type of worker as the ‘price’ of labour to calculate the total labour cost of a typical routine HIV treatment visit. The process map in this example was used only to estimate the amount of clinic staff labour used per visit. But it could be used to build a comprehensive list of inputs. For example, in step 4 it is clear that 25% of visits involve laboratory testing and step 5 suggests that ARV medications are being dispensed. The costing team could learn from a clinical protocol or technical expert about the frequency of CD4 and viral load testing. The cost per test may depend on the amount of transportation of test samples, the type of laboratory machines and so on. The costing of ARV medications is often treated as a separate line item because it represents such a large share of an HIV programme’s total cost and because detailed information usually exists regarding the mix of regimens in use, the quantity of ARVs dispensed and the prices paid for them. Since ARVs are a variable cost that varies with the number of persons being treated, they usually enter the computation of NSP total cost as a unit cost for ARVs per patient-year of treatment.

Figure 8.2. Example of a process map for routine ART treatment visit of a stable patient



Once all the resource types have been identified and (optionally) organized into the activities and/or phases of the intervention, the next step is to estimate the quantity of each resource that is required to produce a certain level of intervention output. In this step, it is usually helpful to decide on a quantity of intervention that you want to use for quantification of inputs. At one extreme, the focus can be a single unit of intervention output, such as a single clinic visit. At the other extreme, one could consider all the clinic visits carried out at a particular site over a period of time, such as one year. But there are intermediate options. For example, one could consider all the routine ART visits taking place in one clinic session. The reason for considering different quantities or durations of intervention delivery is to make it easier to estimate resource use. In fact, one can even use different durations for gathering information on different resources. Some resources, such as labour minutes for measuring vital signs at intake, may be easy to quantify at the level of a single instance of intervention delivery. Other resources may be easier to measure over a longer duration. For example, if laboratory specimens are transported from the clinic to the laboratory in batches only a two days per week, it will be easier to estimate this cost on a per week basis and then use the average number of visits per week to translate the laboratory transport cost to a per visit basis.

The use of unit costs in NSP costing exercises usually implies a simplifying assumption of constant returns to scale. For this reason, a good practice when conducting IBC is to assume a level of intervention output consistent with what is proposed in the NSP and estimate the quantity of each resource required to produce that level of output.

The constant returns to scale constraint in NSP costing exercises can also be mitigated in other ways. It can help to separate the costing of ‘fixed’ shared system infrastructure from the direct variable costs of the intervention, since the variable portion is more likely to have constant returns to scale. This is the approach taken in the IHT software. While not all of the shared system infrastructure is ‘fixed’, it may be reasonable to treat it as such if its scale is sufficient to support all the planned interventions. Another technique that can be used if an intervention scale is changing dramatically over the NSP time horizon is to allow the unit cost to change over time as an intervention is scaled up. In this way, a non-constant return to scale can be approximated.

8.4. Case study: costing long-acting PrEP intervention with the IBC method

Introduction

An NSP is being developed that includes an intervention to provide long- acting injectable–pre-exposure prophylaxis (LA-PrEP) to a population of women at high-risk for HIV infection. The NSP development team's TWG for biomedical prevention indicates that they will be measuring the scale of the LA-PrEP intervention in person-years of LA-PrEP protection. The costing team has determined that there are no relevant primary costing studies for this intervention because it has not yet been scaled up in the country. They have located some literature reporting on the cost of delivering standard oral PrEP in other countries, but decided it is too different to be useful. They found a well-done, recent cost-effectiveness modelling study for cabotegravir LA-PrEP in South Africa *(1)*. In that study, the cost of LA-PrEP delivery was calculated using IBC. However, at the time of the study, the price of the drug itself was not yet known. Indeed, the study was being conducted in part to investigate the price at which the cabotegravir LA–PrEP drug would be cost-effective in the South African context, accounting for downstream savings accrued from averting the need to pay for HIV treatment if cases were prevented. The costing team's literature search also identified WHO guidelines for LA–PrEP *(2)*. While the guidelines state that LA–PrEP can be cost-effective when given to individuals at 'substantial risk', there is no information specifically about the programmatic costs of delivering PrEP services. Still, the guideline usefully informs the team about the process of delivering LA–PrEP and the type of resources likely to be involved.

The costing team also learns from one of the TWGs participating in the NSP team that there is an ongoing pilot implementation of the LA–PrEP as an additional prevention service offered at clinics operated by a local NGO that is one of PEPFAR's implementing partners. The team decides that the best approach for rapidly assessing the likely delivery cost of LA–PrEP will be to gather information from the director of the pilot programme and construct a unit cost for the LA–PrEP intervention using the IBC method. The chairwoman of the TWG assists the costing team by introducing them to the director of the pilot programme.

Key informant interview

The costing team successfully arranges a meeting with the director of the pilot LA–PrEP programme at one of the clinical sites where the intervention is delivered. At the meeting, the team explains that the NSP under development is going to include a scale-up of LA–PrEP, and that they are tasked with constructing an estimate of the unit cost per client-year of the LA–PrEP programme. To do this, they will need to understand the type and quantity of resources required to deliver the programme. But before discussing these resources, the team begins by asking the director for a general overview of the intervention workflow. The costing team's goal is to use the information learned from the director of pilot project to create a process map for the intervention and identify the types and quantities of resource used at each step of the process.

Overview

The director says the pilot programme has been operating for 15 months, and that there is a team of two workers—a nurse and an assistant—delivering the programme in each of four clinic locations. At each location, the team meets with clients during sessions held three days per week, with the fourth day spent on tasks such as inventory management, record review and other quality assurance activities, scheduling and follow-up phone calls to clients. On a typical

day of client visits, there will be several potential new clients who have been referred to the LA–PrEP service who need to be evaluated and, if eligible, counselled on and offered to enrol in the programme and initiated on LA–PrEP. There will also be occasional unscheduled visits with existing clients who are experiencing possible side effects of the medication, and routine scheduled visits with clients who are due for their next LA–PrEP dose.

The costing team has been diligently taking notes while listening to the director. At this point, the team asks the director to confirm that there are three main visit types: new client evaluations; management of side effects; and routine medication administration visits. The director confirms that this is correct. This strategy of periodically pausing to summarize and feed back to the informant what the team has understood helps to consolidate what has been learned.

The costing team then asks a follow-up question about the programme's staffing to clarify whether the two-person service delivery teams at each clinic are working full-time on the LA–PrEP project, or if they have other unrelated clinic duties. The costing team is asking this to determine how much of the workers' labour should be allocated to the LA–PrEP intervention delivery. The director says that the workers' time is fully dedicated to the LA–PrEP programme in the pilot phase, but notes that if the programme were scaled up, it could be staffed differently, with a larger pool of clinic workers spending part of their work time on the LA–PrEP service.

Quantification

At this point in the discussion, the costing team explains to the director that, ideally, they would like to quantify the scale of the programme in units of person-years of PrEP protection For this, they would like to have empirical data from the programme's routine record keeping systems on the following:

(1) The number of potential clients evaluated for LA–PrEP and the proportion initiating LA–PrEP.
(2) The number of visits of each type that are completed per month.
(3) The length of time (or average number of visits) enrolled clients stay in the programme.

If the director cannot obtain or share such information directly from records, the costing team will ask for an estimate based on an understanding of that data or expert judgement. The director, citing previously done research, confirms that 40% of the clients evaluated ultimately initiated LA–PrEP, but that the number of clients and visit types varies by day and by clinic site. The director also states that the pilot programme got off to a slow start in the early months because it took time to train staff and generate demand through the NGO's existing community outreach activities. The best guess now that the programme is more mature, at each location, is that they are screening about 20–30 clients per week. The costing team summarizes this information with a mid-point assumption of 25 clients evaluated per week, of which 10 (40%) are enrolled, on average.

The director says that patients that are enrolled are supposed to return for a follow-up visit two weeks after initiation, and every two months after that. However, it may be too soon to determine the average amount of time an enrolled client will stay on LA–PrEP since many of the clients enrolled are still in the programme. Of the 200 patients enrolled at the time of the report, 150 patients had been enrolled long enough to be due for a second dose. Of those 150, 120 received a second dose approximately two months after enrolment. Of the 120 receiving a second dose, 70 had been enrolled long enough to receive a third dose at month four, and 65 received a third dose.

The costing team uses that information to create a chart showing the retention pattern. It seems that 20% of those that initiate LA–PrEP did not continue after the first dose. However, after that initial dropout rate, retention is high: 65 out of 70 of those in the programme for the second dose stayed for the third dose. The director's view is that while there is no formal estimate, as the programme has continued the high retention rate seems to have been sustained beyond the third dose, and at least as long as the sixth dose.

At this point the costing team has gained a lot of useful information. They know that only 40% of those evaluated for LA–PrEP actually start the treatment. This is useful since it helps determine the resources needed to recruit a new client. In addition, they have learned that it might be reasonable to assume that 20% of LA–PrEP initiators (clients who get the first dose) will not continue past that dose, but any client who makes it to the second dose will likely stay in the programme—with a 7% dropout rate between each subsequent dose. Thus, of those that initiate LA–PrEP, 60% will still be protected after one year. It also suggests that for each person initiating, over one year, an average of 4.5 doses will be delivered, and 0.75 person-years of protection can be expected (Table 8.1).

Table 8.1. Example of calculations based on information from a key informant

Dose	1	2	3	4	5	6	Per person enrolled
Month	0	2	4	6	8	10	
Dropout	0.2	0.07	0.07	0.07	0.07	0.07	
Retained	100%	80%	74%	69%	64%	60%	
Expected doses	1	0.8	0.74	0.69	0.64	0.6	4.5
Person-months of coverage	2	1.6	1.5	1.44	1.3	1.2	9.0

Labour

The costing team can now formulate some questions to quantify the labour input by asking how many hours each staff member works on the days of the week when they see clients. The director says that on those days, including setup and closing, the nurse and assistant work eight hours each. On the fourth day of the week, the team does not see clients but spends a morning shift (about five hours) doing record-keeping, inventory tracking, and outreach phone calls to enrolled clients. The costing team decides to use a top–down approach to estimating the labour portion of unit cost, where the total labour over a period is divided by the number of units of programme output. This is much less effort than trying to measure how much labour time is spent on particular activities like administering the HIV risk screening questionnaire, conducting HIV antibody tests and liver function tests, and counselling prospective clients, or conducting monitoring visits and providing LA–PrEP injections to enrolled patients.

Still, the costing team needs to know how many patients the team can handle in a year. The director says that both screening visits and ongoing treatment visits take about 20 minutes each. They see patients for three ten-hour shifts per week but about two hours is spent on set-up, closing and breaks, so eight hours of patient visit time allows for 24 visits per day, or 72 visits per week. Accounting for four weeks of annual holiday weeks when the clinic is not open,

i.e. 72 visits x 48 weeks = 3456 visits per year. The director notes that currently they spend much more than half their time screening new patients as they build up their roster of clients. But the portion of screening visits will decline over time as their roster of patients grows. The director estimates that each year, a mature programme would have about 525 clients enrolled and would be screening about 300 persons per year to recruit about 125 new patients to fill slots that open up when existing clients discontinue their care. With 525 clients in treatment, each having an average of six treatment visits per year, which would be 3150 treatment visits, leaving room in the schedule for 300 screening visits (Box 8.1).

Box 8.1. Adjusting costs of ingredients for inflation

In Box 7.3, a simple method was presented on adjusting unit costs for historical inflation using the Kumaranayake method. However, when conducting IBC, it is beneficial to tailor the approach to inflation to reflect the specific ingredients being costed. In such cases, the following the method should be considered.

In using IBC, some of the prices or costs collected for the ingredients may not be current: they could be a few years old. These historical costs will need to be adjusted for inflation to ensure they reflect current market values.

The key concepts are tradeable versus non-tradeable costs:
Tradeable inputs are items purchased internationally (e.g. drugs, medical equipment, vehicles) and their prices are influenced by global trends. Their costs are typically adjusted using the US dollar GDP deflator. Non-tradeable inputs are items purchased locally (e.g. human resources, rent and utilities). Prices are influenced by local economic conditions and should be adjusted using the local consumer price index (CPI).

The first step is to determine whether the ingredient being inflated is a tradeable or non-tradeable item. The appropriate inflation measure should be used to adjust the cost. For tradeable items, consult the World Bank database for the GDP deflator (base year varies by country)- United States. For non-tradeable items, use the Consumer price index (2010 = 100) for your NSP country. Suggestion: download the Excel file, navigate to the data Tab and locate the row for the USA (for the GDP deflator), or the NSP country (for the CPI). Consult the relevant columns corresponding to the base year and target year to retrieve the necessary data. the necessary data.

To adjust cost for inflation, use the following formula for **tradeable inputs**:
Adjusted cost of tradeable item = Base year cost x US dollar GDP deflator target year/US dollar GDP deflator base year

For **non-tradeable inputs:** Adjusted cost of non-tradeable item = Base year cost x local CPI target year/local CPI base year.

Capital items

The intervention takes place in a small (3 m^2 area) examination room within a larger clinic. The room is equipped with a desk, a storage cabinet, three chairs and a computer. This room is used mostly for the LA–PrEP programme.

Cell phones are another type of equipment that is required for the intervention. If included in the costing, phones would also be categorized as capital items. However, the costing team decides to omit the capital cost of the phone itself, since it is a personal item of the nurse. The team reasons that the nurses would have cell phones whether or not the LA–PrEP intervention existed, and the cost of the phones are not borne by the LA–PrEP programme.

While these resources are required to deliver the intervention and should be incrementally allocated to LA–PrEP in a full economic costing, it is possible that in the context of a given NSP these inputs are costed separately or are considered existing infrastructure and not included in the direct costs of the HIV programme and omitted entirely from the costing. While these alternative choices about what to include in the NSP costing are all valid, it is vital that the choice is documented and applied consistently to all interventions in the NSP.

Input unit costs

The costing team obtains information on the unit cost of each input from the NGO. The director uses information from the payroll records to estimate the average hourly gross salary for different types of workers. This includes all benefits and personnel costs, such as housing allowances, as well as health insurance and pension contributions made by the NGO on the workers' behalf. The director consults with the NGO's bookkeeper responsible for tracking the programme's finances to estimate prices paid for consumable items that were purchased. The NGO did not have information on the unit cost of the liver function test (LFT), which is conducted at a third-party laboratory, because the NGO has a contract with that facility for a bundle of services. Later, the costing team learns from the laboratory that they charge other clients $5.25 per LFT, not counting sample collection.

To estimate the cost of the equipped examination room, the costing team was able to obtain records of the annual cost for the full clinic (the annualized capital cost of physical infrastructure, plus the recurrent cost of building maintenance and energy costs). Then this cost was divided by the area (in m^2) of the building and the yearly hours of operation of the clinic, resulting in an average hourly cost of $3.00 per m^2. Since the room used by the LA–PrEP programme is about 3 m^2, the hourly cost was assumed to be $9.00.

8.5. Calculating output unit cost

Taking all this into consideration, the costing team produced the calculations shown in Table 8.2. Over one year, the LA–PrEP programme at one location costs $149 871.50. From this, the costing team can divide by 525 clients (in that same year) to get an annual unit cost per LA–PrEP client served of $285. The costing team notes that the cost per LA–PrEP client treated includes the cost of screening clients who are not infected, and that the unit cost estimate therefore depends on the yield of the screening programme (Table 8.2)

Table 8.2. Ingredients-based costing of LA–PrEP

Resource category	Ingredient					
Labour	**Screening and treatment**	**Annual salary**	**Effort allocated to LA–PrEP**	**Cost /year**	**Quantity /year**	**Line total**
	Medical Director	$21 000	10%	$2100.00	1	$2100.00
	Nurse	$6500	100%	$6500.00	1	$6500.00
	Nurse assistant	$3000	100%	$3000.00	1	$3000.00
Consumables		**Unit cost**	**Quantity /visit**	**Cost /visit**	**Quantity /year**	**Line total**
	Screening visits					

Resource category	Ingredient					
	HIV test	$1.00	1	$1.00	300	$300.00
	Blood draw (alcohol swab, bandage, gloves, collection tube, needle)	$2.15	1	$2.15	300	$645.00
	Liver function test	$5.75	1	$5.75	300	$1725.00
	Treatment visits					
	Cabotegravir, 600 mg per injection	$32.00	1	$32.00	3150	$100 800.00
	Injection supplies (alcohol swap, bandage, gloves)	$0.70	1	$0.70	3150	$2205.00
	HIV test: 1 test	$1.00	1	$1.00	3150	$3150.00
	Blood draw (alcohol swab, bandage, gloves, collection tube, needle)	$2.15	0.5	$1.08	3150	$3386.25
	Liver function test: 1 test	$5.75	0.5	$2.88	3150	$9056.25
	Other					
	Cellular airtime minutes (per minute)	$0.10	6240	$624.00	1	$624.00
Capital		**Unit cost**	**Qty/year**	**Cost /year**	**Quantity /year**	**Line total**
	Examination room (1 hour)	$9.00	1820	$16 380.00	1	$16 380.00
					Total	$149 871.50
					Clients	525
					Unit cost/client-year	*$285.47*

8.6. Conclusions

In this chapter, various options for estimating unit costs have been explored. In the next chapter, the quantities are added.

References to Chapter 8

1. Jamieson L, Johnson LF, Nichols BE, Delany-Moretlwe S, Hosseinipour MC, Russell C, et al. Relative cost-effectiveness of long-acting injectable cabotegravir versus oral pre-exposure prophylaxis in South Africa based on the HPTN 083 and HPTN 084 trials: a modelled economic evaluation and threshold analysis. Lancet HIV. 2022;9(12):e857–e867. doi: 10.1016/S2352-3018(22)00251-X..

2. Guidelines on long-acting injectable cabotegravir for HIV prevention. Geneva: World Health Organization; 2022.

Chapter 9: Estimating total cost and presenting results

Objective

- Estimating the total resource requirements of the NSP.

Methods

- Consider whether intervention unit costs will change during the NSP time horizon. Generate a table of year-specific unit costs that covers the NSP time horizon. For all interventions that have a unit cost estimated, determine the year-specific quantity of units of the intervention required to achieve NSP goals.
- Multiply the year-specific unit cost by its corresponding quantity of intervention output to obtain a year-specific total cost. For interventions that are costed using a lump sum, these can be entered directly.
- Finally, apply any cost mark-ups, taking care to mark up only the appropriate cost lines in the budget table, and avoid inadvertently double counting.

Outputs

- Intervention scale-up quantification for NSP scenario.
- NSP cost summary table.

Principal actors

The costing team.

Corresponding workbook tab

3.1. Unit costs.
3.2. Population indicators.
3.3. NSP total cost.

Alternative tools for projecting total NSP costs

- Integrated Health Tool.
- Resource Needs Model (HIV specific).

9.1. Introduction

An ‘NSP budget’ projecting the total cost of the NSP is usually the most anticipated and scrutinized piece of the costing team’s work. The budget table informs stakeholders of the resources needed to implement the strategy, broken down by NSP objective, intervention and year. Knowing the expected cost of the NSP is essential to developing a plan for financing the HIV response and a key piece of evidence used to mobilize resources.

The NSP development team and its stakeholders often consider several alternative versions of the NSP, modelling the projected impact and cost of each version as a distinct scenario. When comparing these scenarios, resource requirements are usually an important consideration, especially if stakeholders are focused on developing an NSP that is financially feasible.

To generate a total resource needs projection, the costing team will not only need to have estimated the average unit costs for each intervention for each year but also input the scale of implementation (coverage) of each intervention, over the NSP time horizon. Scale is described in quantities of intervention output units per year. The coverage quantities are multiplied by the unit cost to determine the total cost of that intervention in each year of the NSP.

This is the point when the analyst team needs to make the choice to either move to an existing costing model, such as the Integrated Health Tool (IHT) or the Resource Needs Model (RNM), to project total costs, or remain within the included excel template. To help the analyst team make this choice Boxes 9.1 and 9.2 provide an overview of these models and how they work, respectively. The IHT is especially useful for capturing above-service level costs, referred to in the IHT as programme costs, and when projections are needed for multiple conditions, e.g. TB. The RNM is simpler and specific to HIV. The accompanying template builds strongly on the RNM, which is based on unit costs times quantities as described below.

The total costs of each intervention are added together to obtain the cost of the complete NSP in each year. Beyond this, the costing team will have many options for breaking down the total cost in informative ways, such as calculating the total cost for groups of interventions organized by categories (e.g. prevention, treatment), by strategic objective (e.g. reducing stigma), by target population group (e.g. adolescent girls and young women), or by resource (ingredient) type (e.g. wages, medications and laboratory tests).

Box 9.1. Using the IHT for projecting total NSP resource needs

The Integrated Health Tool for Planning and Costing (IHT) is a user-friendly tool to assist with estimating costs of strategic plans and health investments at the country level. It is an updated, online version of the desktop OneHealth Tool (OHT). Similar to the OHT, the IHT is developed to support low- and middle-income country planners with a comprehensive framework for scenario analysis, costing, and health impact analysis, to inform planning and budgeting for health packages and health strategies.

Both the OHT and IHT include the ability to analyse costs of HIV programmes either as a stand-alone set of costs, or as part of a holistic health sector planning exercise. HIV programme costs include health service delivery interventions, programme support activities, and societal enablers. Users can identify key services and strategic activities, calculate associated costs, and link service targets to overall health system investments.

The OHT/IHT provides a set of default assumptions including a suggested set of interventions and associated service delivery inputs, as well as allowing customization of the structure and assumptions included for all elements of the costing, ensuring the ability to align with the unique aspects of country approaches found in HIV national strategic plans.

By combining health service coverage targets and inputs for the health services across delivery platforms, the tool calculates the aggregated required investments needed to provide a comprehensive package and associated activities: medicines, diagnostics, medical devices, health personnel, infrastructure, and more.

The costing approach applies ingredients-based costing, multiplying quantity by price (i.e. unit costs), for the service delivery interventions as well as for societal enablers and programme support components. The user has the option to apply mark-up percentages or lump sums for health system costs, or to cost out detailed health system plans and investments, depending on scope and purpose.

Cost estimates are reported in a standard set of tables and graphs, including standard reporting categories used in Global Fund proposals. Costs can also be mapped to user-defined budget categories, facilitating the generation of budgets which can be used to inform budgets, planning and financing requests.

Both OHT and IHT include internal links to demographic and HIV epidemiological modelling software, allowing dynamic estimates of populations in need of services for costing (for example, adults and children needing ART), as well as projecting the health impacts (mortality and morbidity) of strategic plan targets.

Users can download the OHT at https://www.avenirhealth.org/software-onehealth.html, and the IHT will be available after field testing in late 2025.

Box 9.2. Using the Resource Needs Model for projecting total NSP resource needs

The Resource Needs Model (RNM) is a tool designed to calculate resource needs for HIV/AIDS programs. It estimates the total financial resources required for prevention, care and treatment, and support for vulnerable populations like orphans and vulnerable children, as well as policy and programme support.

First used in 2006, the RNM has been made available in excel and Spectrum desktop versions, and has been used to cost many national HIV plans (many for multiple plans per country) and the UNAIDS Strategy 2011–2015 ("Getting to Zero"), the 90–90–90 targets established in 2014, UNAIDS Fast Track Strategy 2016–2020, as well as the Global AIDS Strategy 2021–2026.

The RNM is linked with demographic projections and the AIDS Impact Model (AIM) to provide estimates of populations needing services, and the impact of PMTCT and treatment. RNM can also be linked with Goals, which can estimate the impact of biomedical interventions (condoms, PrEP, VMMC, ART, PMTCT) as well as behavioural interventions, allowing a more expansive view of the impact of a strategic plan.

Intervention costs are calculated by multiplying population sizes and coverage by a unit cost per person reached. Programme support costs are calculated based on a percentage or an absolute number over and above intervention costs. Users have flexibility to adjust the prevention and outreach programmes to match the high-risk groups described in the plan being costed. Care and treatment programmes can reflect the differentiation in costs between new ART clients, and those continuing in care, as well as the differing costs of drugs for first and second line.

In general, the RNM requires less detail and data than the OHT/IHT, and provides a bespoke environment focused on HIV NSP costing, but has correspondingly less detail, and cannot be used to cost a full health sector plan.

The tool can be accessed via Spectrum at https://www.avenirhealth.org/software-spectrum.html.

9.2. Calculating the intervention quantities

Most of the information needed to calculate the intervention cost totals in the NSP Cost Summary Table will have been gathered or generated at earlier steps in the costing exercise. The intervention categories, the intervention specifications, the unit costs, markups and lump sums will have already been determined, and can simply be transferred into the NSP Cost Summary Table. However, the quantification of intervention coverage and scale-up over the NSP time horizon may not have been done.

When developing the intervention unit costs, the costing team should have already considered the approximate scale at which the intervention will be implemented, since the scale can impact the unit cost. This is discussed in earlier chapters covering methods for gathering and adapting existing unit cost evidence and estimating unit costs with an ingredients-based approach. For the calculation of total cost using a P × Q approach, it will be necessary to specify the exact quantity of each intervention, expressed in the same units that were used as the basis of the intervention unit cost.

The costing team will likely have several tasks related to intervention quantification. First, the costing team may need to do some work to translate information on NSP goals and programme scale to intervention quantities in the format required for costing. During the process, the costing team will have iterative discussions with the rest of the NSP development team. Members of the NSP development team that have technical expertise in intervention delivery and with responsibility for defining NSP goals should provide the costing team with information to estimate the required intervention scale in the format needed for the costing exercise. Generally, to quantify the intervention scale in a manner that is adequate for costing, information on the intervention's target population size, current coverage and targets for coverage over time are needed.

While not strictly necessary for making a cost projection, the NSP development team will usually need to use knowledge about the intervention's effectiveness to ensure that the planned coverage will be sufficient to achieve epidemiological outcomes that may be part of the stated goals of the NSP. For example, if the NSP has a goal of reducing annual AIDS deaths by 25% over three years, the team will need evidence on the effectiveness of interventions such as ART at reducing AIDS mortality.

The team will most likely rely on previous or concurrent impact modelling work to understand the relationship between intervention target population size, coverage, output quantity, programmatic goals, and epidemiological outcomes (e.g. new infections, AIDS deaths, DALYs). Several HIV policy modelling software programs have been developed, and a comprehensive list is maintained by the HIV Modelling Consortium (http://hivmodeling.org/hiv-models). These models combine information on target population size, intervention coverage, and intervention effectiveness to forecast impacts on the epidemic trends and health outcomes. Some of these models are location-specific, but others have been developed as general tools. Among them, Spectrum/AIM/Goals and OptiMA HIV are frequently used in the context of NSP development to model future scenarios and forecast how the scale-up of HIV interventions will affect HIV mortality, incidence and disease burden. The IHT also utilizes demographic and epidemiological estimates from Spectrum/AIM.

The role of the costing team in quantifying the scale-up of interventions can vary substantially depending on whether the NSP development project has a team includes expertise in using software models such as Goals. When there is capacity to do concurrent modelling work simulating different policy scenarios, the costing team can ideally collaborate with the team members responsible for running the policy modelling software to generate intervention quantities. If the NSP development project does not include distinct impact modelling work, the costing team may have primary responsibility for obtaining past modelling work or expert judgment of other members of the NSP team with intervention expertise and using it to estimate the scale of intervention required. Tab 3.2 provides a template for a range of ways to estimate quantities for different types of interventions.

9.3. Total projected cost table template

The last step for the first estimation of total costs is to multiply unit costs by quantities. The basic structure of a budget table is shown in Table 9.1. To save space in this simple example, the NSP consists of just five interventions grouped into two categories, and the time horizon of the NSP is two years. In real NSPs, there are several categories of intervention, dozens of interventions and longer time horizons. Additionally, the interventions may be organized by, or mapped to, the NSP's objectives. Sometimes the target population of interventions is also

included in a budget table, so that the allocation of resources to population groups can be reported.

Generally, the projected cost table will have one row for each intervention and columns for describing the units with which the intervention's output is measured and the base unit cost that has been estimated for it. Further to the right will be a set of columns showing the year-specific unit cost for each year of the NSP time horizon. The year-specific unit costs may differ from the base year unit cost if the costing team is anticipating a change in the prices of inputs for that intervention, or if the team has been asked to report costs in nominal currency units based on some projected inflation trend. The next set of columns will show the number of units of intervention output planned for each year of the NSP time horizon. How to obtain these quantities will be discussed later in this chapter. At the far right of the table will be a set of columns reporting the calculated total cost for each intervention in each year, simply PxQ. The costing team can add rows and columns to the table as needed for reporting subtotals by groups of interventions, or grand totals for all interventions and the full-time horizon.

For some interventions, the cost may have been estimated as a lump sum. In this case, there will not be an output unit defined or yearly quantities of output to report. In the budget table, those fields will be blank and only the total cost fields will be filled. An example of this is Intervention 2.2 in Table 9.1. Similarly, for some interventions, the costing team may have chosen to use a percentage 'markup.' Again, there will be no units of quantity to report. However, it will be necessary to report both the percentage markup assumed and the specific intervention lines to which the markup is being applied. In Table 1, Intervention 1.3 is a 15% markup of all interventions in one category (Category 1) and Intervention 3.1 is a 10% markup of all interventions in Categories 1 and 2.

A single-category markup (e.g. Intervention 1.3) might be used to capture a shared overhead cost that is specific to that category of interventions. For example, if Category 1 was a set of human rights-focused interventions which were all supervised and managed by a particular government agency, Intervention 1.3 might be intended to capture the cost of operating this agency. When an item such as Intervention 1.3 does not involve the direct provision of services to a target population, it may be described as an indirect cost, an overhead cost, or an above-service level cost.

In some cases, it might be appropriate to mark up the cost of interventions in the NSP by some percentage to capture an above-service level intervention. For example, in some NSPs, a standard markup (e.g. 1.5%) of all direct service interventions might be budgeted for 'operational research, monitoring and evaluation' activities. Instead of including the cost of these activities within the individual unit cost of each intervention, the costing team can choose to use a general markup approach and report operational research, monitoring and evaluation as a separate intervention line specific to that set of activities.

Table 9.1. Structure of an NSP projected cost table

Intervention category	Intervention name	Costing method	Intervention unit of measure	Base year unit cost/ markup	Year-specific unit cost or markup %		Year-specific quantity		Total cost			% of Cat.	% of total
					Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	All Years		
Cat 1	Int. 1.1	PxQ	Patient-year	$150	$150	$125	10	10	$1500	$1250	$2750	83%	47%
Cat 1	Int. 1.2	PxQ	Person tested	$12	$12	$12	5	5	$60	$60	$120	4%	2%
Cat 1	Int. 1.3	Markup	n/a	15% of Cat. 1	15%	15%	n/a	n/a	$234	$196	$430	13%	7%
			Cat 1 subtotal						$1794	$1506	$3300		39%
Cat 2	Int. 2.1	P x Q	AGYW reached	$75	$75	$75	10	10	$750	$750	$1500	60%	26%
Cat 2	Int. 2.2	Lumpsum	n/a	n/a					$3000	$0	$3000	40%	17%
			Cat 2 subtotal						$3750	$750	$4500		54%
Cat 3	Int. 3.1	Markup	n/a	10% of Cat 1&2	10%	10%	n/a	n/a	$294	$286	$580	100%	0%
Cat 3 subtotal									$294	$286	$580		7%
			Grand total (all categories)						$5838	$2542	$8380		
			% of total						70%	30%			

9.4. An example

To illustrate the process a costing team might use to quantify intervention scale-up, consider an example in which an NSP includes a goal of reaching the 95–95–95 programmatic targets for ART. The NSP will include ART as an intervention or as a group of interventions that are target-population specific (e.g. ART for adults, paediatric ART), or regimen type-specific (first line ART, second line ART). To keep the example simple, a single ART intervention is considered that needs to be costed. At an earlier stage, the costing team has obtained an estimate of the unit cost of ART per person-year. So, what is now needed is an estimate of the intervention scale measured in person-years over the time horizon of the NSP such that the NSP's 95–95–95 goal is met.

Note that the goal statement provided did not specify a date for reaching 95–95–95. Thus, the first thing a costing team would want to confirm is the actual coverage rate currently (the baseline) from which the goal is to reach this target by the end of the NSP time horizon. The costing team will also note that this type of goal statement contains no information about the pace of intervention scale-up. A commonly used assumption is that progress toward a goal—from the baseline level to the target level—will occur steadily (i.e. linearly) over the NSP time horizon, but the costing team should confirm such assumptions with the broader NSP team. In some projects, the non-constant pace of scale-up such as front-loading or starting slow and accelerating over time are explored in scenario analysis to see what impact they have on the epidemic and costs, or to accommodate implementation feasibility constraints.

The goal statement is constructed as coverage percentages; 95% of all people living with HIV know their status, and 95% of those people who know their status (i.e. 0.95*0.95 = 91% of all these people) are receiving the ART intervention. The costing team needs to translate this to person-years of ART. So, they will need to have a forecast of the total number of people living with HIV in each year of the NSP.

The number of people living with HIV over time will depend on several factors, including current prevalence, age and population group-specific incidence rates, and the age and population group-specific mortality rate. These rates can be affected by HIV interventions and vary over time. Because of this complexity, a transmission-dynamic model such as Goals is usually used to make forecasts of future prevalence.

If the NSP development project is not modelling NSP scenarios with software that captures the feedback of NSP interventions on epidemic trends during the NSP time horizon, then the costing team might need to use an exogenous forecast of people living with HIV, such as a simple extrapolation of recent trends. Even if the NSP development project does not have a modelling component or available technical experts to apply tools such as Goals or IHT, a costing team can at least access past epidemiological forecasts or use default files for Spectrum/AIM which include estimates of people living with HIV/AIDS who need ART (as well as several other interventions' target populations). In the absence of a full application of Goals or IHT, 'back of the envelope' calculations derived from past forecast and/or default Spectrum/AIM files may be sufficient for a first approximation of the target populations and coverage targets for rough estimation of the resources required for ART.

Assuming that the costing team has obtained an estimate of people living with HIV in each NSP year, knows the baseline proportion of those people who know their status and baseline ART coverage level, and has confirmed the scale-up assumption (linear or other), they can then calculate the person-years of ART needed in each year. Table 9.2 shows a simple example of a four-year NSP time horizon in a setting where the first '95' (95% of people living with HIV/AIDS

who know their status) has already been met and is assumed to stay constant over the NSP time horizon. The baseline value for the second '95' (95% of people living with HIV/AIDS who know their status are on ART) is 75% at the start of the NSP time horizon, and a linear pace of scale-up (five percentage points per year) is assumed.

Table 9.2. Example of translating the NSP goal statement to intervention quantity and cost

Parameter	Baseline	NSP Year 1	NSP Year 2	NSP Year 3	NSP Year 4
People living with HIV/AIDS	10 000	10 888	11 764	12 628	13 481
Proportion who knows their status	95%	95%	95%	95%	95%
People living with HIV/AIDS who know their status	9500	10 344	11 176	11 997	12 807
Proportion on ART—start of year		75.0%	80.0%	85.0%	90.0%
People living with HIV/AIDS on ART—start of year		7758	8941	10 197	11 526
Proportion on ART—end of year	75%	80.0%	85.0%	90.0%	**95.0%**
People living with HIV/AIDS on ART—end of year	**7125**	**8275**	**9500**	**10 797**	**12 167**
Unit cost of ART per person-year	$200	$200	$200	$200	$200
Total cost of ART	$1 425 000	$1 654 976	$1 899 905	$2 159 470	$2 433 356

In Table 9.2, the ART unit cost is assumed to be constant ($200) over the NSP period. However, in real applications, the forecast of people on ART may consider the distribution of patients across specific drug regimens which have different prices. If the mix of regimens and their prices changes over time, this would affect the unit cost.

In this example, the costing team has not dealt explicitly with the third '95' (95% of people on ART are virally suppressed). In the most basic approximation, the cost of ART does not depend on viral suppression. On the other hand, if the baseline value of the third '95' is less than 95%, there will likely be some intervention requiring resources or efficiency improvement to meet the target. For example, if the baseline value is that 80% of people living with HIV on ART are virally suppressed, there will need to be some action taken to improve it. There may need to be an increase in the frequency of viral load among ART patients or. there may be a need for other actions such as increasing ancillary patient support services (e.g. adherence clubs, phone-based reminders and counsellors to follow up missed appointments) to improve retention in care or medication adherence. These actions will likely have a cost that should be captured in the NSP as part of the ART intervention or as separate interventions to improve treatment outcomes.

Once all the NSP interventions annual costs have been calculated in this way, they can be summed, and the initial total cost estimate is now ready for presentation. Tables 9.3 and 9.4 are examples of results tables with unit costs and projected total costs by intervention area.

Table 9.3. Presentation of high-level methods and unit costs

Intervention /technical efficiency factor /enabler	Programme area	Unit cost (in South African Rand (R)	Cost value	Source	Notes
1a HIV interventions					
Cotrimoxazole	ART	R 93.72	Per patient-year	*(1)*	
ART (Adults)	ART	R 3292	Per patient-year	*(2)*	Cost reported is for 2014–2015 only
ART (Paediatric)	ART	R 3422	Per patient-year	*(2)*	Cost reported is for 2014–2015 only
Voluntary medical male circumcision (VMMC)	VMMC	R 1210.19	Per circumcision	CHAI (public sector sites) PEPFAR (NGO sites); both PC	Weighted average of public sector and NGO services
Early infant male circumcision	VMMC	R 605.10	Per circumcision	Based on above	Assumed to be 50% of adult MMC cost
VMMC age group targeting	VMMC	R 1322.90	Per circumcision	From ingredients	MMC cost augmented with outreach and community mobilization costs
Condom use	Care coordination programme	R 0.68	Per condom	From ingredients	Weighted average of male and female condoms, including distribution costs
Male and female condom education	Care coordination programme	R 45.46	Per person educated	From ingredients, based on Ref. *(3)*	
Prevention of vertical transmission of HIV (mother not on ART)	Prevention of vertical transmission of HIV	R 62.38	Per mother–baby pair	*(2)*	
Prevention of vertical transmission of HIV B (mother not on lifelong ART)	Prevention of vertical transmission of HIV	R 2260.03	Per mother–baby pair	*(2)*	
Infant testing at birth	Prevention of vertical transmission of HIV	R 389.49	Per patient year		
Infant testing at six weeks	Prevention of vertical transmission of HIV	R 369.11	Per patient year		

Source: South African HIV and TB investment case: Summary report, Phase 1. Johannesburg: Department of Health and South African National AIDS Council; 2016; p. 246.

Table 9.4. Presentation of total projected resource needs over time

No.	Intervention area	2017–2018	2018–2019	2019–2020	2020–2021	2021–2022
1	Antiretroviral treatment	16 300	18 753	20 572	22 230	23 289
2	TB screening and diagnosis	2759	3144	3462	3764	3802
3	Adherence strategy	1801	2715	2222	2265	2265
4	TB treatment	2167	2200	2222	2247	2220
5	HIV testing services (HTS)	1361	1396	1396	1431	1431
6	Treatment care and support	1347	1335	1325	1317	1312
7	Psychosocial support	750	1006	1040	1057	1074
8	Vertical medical male circumcision	978	978	902	902	752
9	Vulnerable children and youth	802	84?	924	933	934
10	Key and vulnerable populations	702	826	885	942	1012
11	STI screening and diagnosis	633	688	795	850	935
12	Programme management	691	732	775	821	870
13	HPV vaccination	676	770	780	791	801
14	Social and behaviour change communication (SBCC)	649	694	709	725	732

All cost estimates use 2017 prices and exclude inflation.

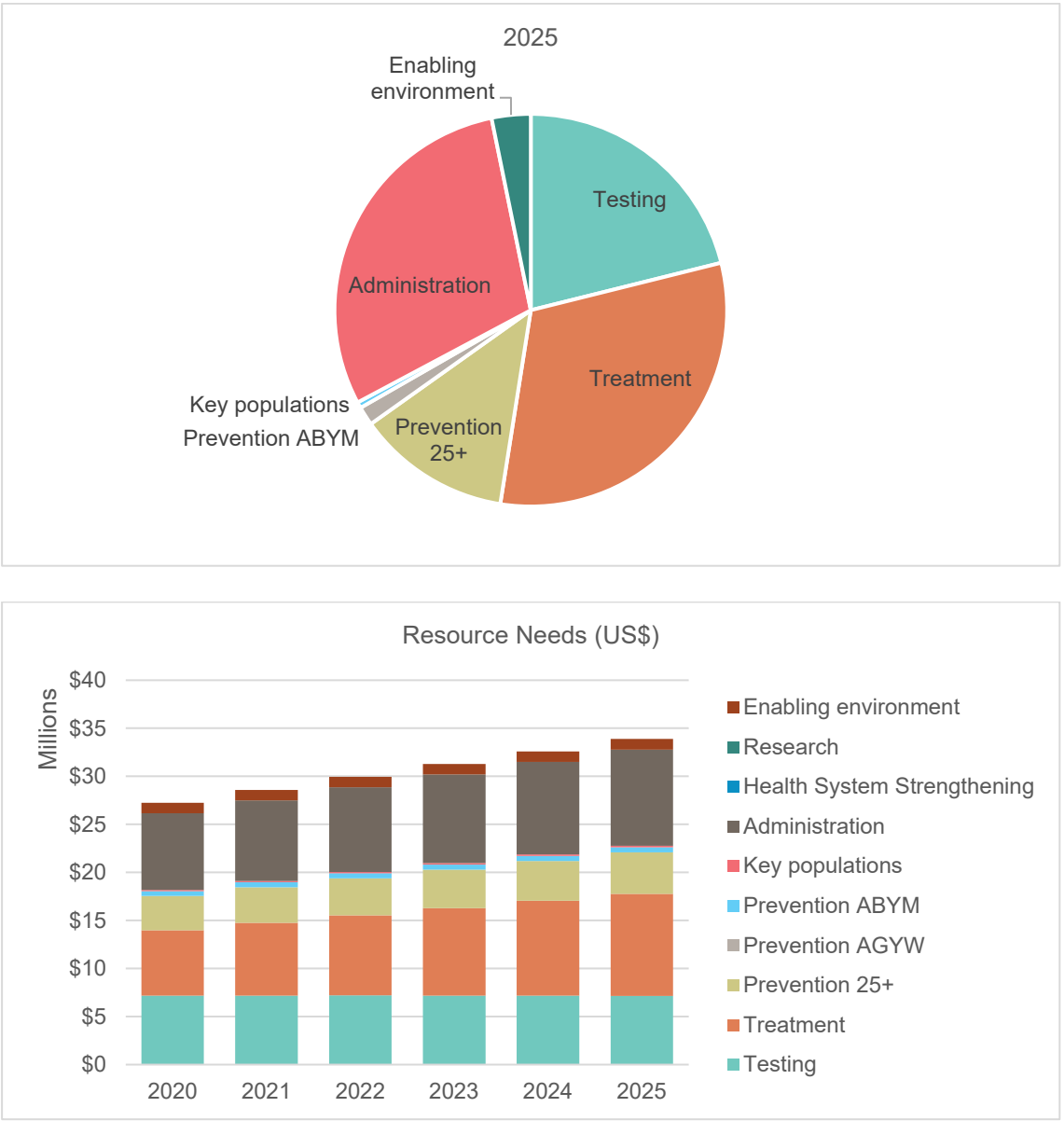
Source: Let our actions count: South Africa's national strategic plan for HIV, TB and STIs, 2017–2022. Pretoria: South African National AIDS Council; 2017; p.43. https://sanac.org.za//wp-content/uploads/2017/06/NSP_FullDocument_FINAL.pdf

Note that the footnote to the table clearly states the year the costs are presented.

It can be useful to include a percentage of total costs for each of the intervention categories. This also helps to identify interventions with costs that are unexpectedly high or low. If this is not a mistake, then it will need to be explained. Expectations might be based on the absolute value of the project costs, or the relative share of total costs towards any interventions relative to the most recent past costed NSP.

Some figures may be expressed as bar charts or pie charts, which can intuitively portray the relative value of the interventions, e.g. pie charts are useful to emphasize the relative share of resources needed across interventions or population groups (Figure 9.1). Bar charts for each year of the NSP capture relative sizes as well as absolute needs and show trends over the NSP period. For example, they can show changes in overall costs, such as costs coming down due to effective prevention, or reductions in unit drug prices. Placing the total needs per annum alongside bars representing the financing landscape (of the projected available resources per annum over the NSP period) is a good way to represent gaps in funding.

Figure 9.1. Pie and bar charts for visualizing relative resource needs



9.5. Systematic error checking

Throughout the costing exercise, the costing team should be vigilant to avoid double counting or undercounting resource use. At the earlier stage of adapting existing unit cost estimates and generating an ingredients-based unit cost for interventions, there is an opportunity to verify what activities or types of resources have been included in the unit cost. When choosing a markup percentage and deciding to which interventions to apply the markup, there is a second opportunity to verify whether the application of the markup is introducing a double counting (or under-counting) error. Finally, since the resulting NSP cost summary table can be quite large and complex in structure, it is a good practice to systematically review the results of the calculations in the budget table to verify there are no errors. This review includes verifying that mark-ups are not introducing any double counting, especially in situations of nested markups (where a markup is applied to another markup). The review should also systematically search for undercounting. For example, when using the ingredients-based approach to estimating unit

cost for a clinical intervention that includes administration of a medication, it is possible that the input quantity assumption for the medication may not have considered wastage, which may occur due to product expiration or damage. Even in well-functioning programmes with high quality service delivery systems, some level of wastage may be reasonable and expected. Box 9.3 explains how the existing National AIDS spending assessments (NASAs) that have been recently completed in the same country can support validation of total estimates.

Box 9.3. Using NASAs to quality check totals

At the final stage of estimating total NSP costs, the team should conduct a quick validation exercise using available recent NASA data to reference past total expenditures per program area and overall total HIV spending in the country. It is crucial to ensure that NSP cost estimates remain within a reasonable range of historical expenditures, assuming the NASA has been implemented correctly and comprehensively (which the costing team should attempt to ascertain by reading the methodology, assumptions and limitations). Overestimating NSP costs can deter policymakers from committing resources, potentially hindering their optimal allocation and delaying implementation.

As highlighted in Chapter 7, NASA data might have underestimated certain costs since the process may not account for all shared expenditures. However, this difference should not be substantial, unless a large increase in coverage in certain interventions or an entirely new intervention is being planned. If there is a significant discrepancy between projected NSP costs and past expenditures, the team should carefully examine whether the issue lies in:

- Intervention valuation: Are prices overestimated?
- Target quantification: Are targets overly ambitious?

Additionally, past expenditures may be lower than projected costs for legitimate reasons, such as:

- Insufficient resources and funding in previous years for the HIV programme.
- Service delivery challenges due to contextual factors (e.g. political instability, supply chain disruptions, etc.).
- Actual scale-up rates were much lower than hoped for in the new NSP period.
- An innovative intervention (such as long-acting injectables) has not been implemented at the time of the NASA.

By leveraging NASAs and carefully considering past recorded expenditures, the team can conduct a rapid 'reality' check of their final total estimates. This not only enhances the credibility of their NSP costing work but, more importantly, ensures realistic and actionable financial planning.

Finally, it is time for the costing team to go through the review checklist (Appendix 3) to check the quality and completeness of the work.

The next chapter examines how robust this analysis is to internal assumptions, external situations and potential efficiency improvements. In addition, several scenarios may be explored representing different variations of the NSP to help the NSP development team decide on what will be included in the final NSP. These variations may include a slower or faster pace of intervention scale-up and prioritization of a subset of interventions to satisfy the constraints of an expected resource envelope.

Chapter 10: Further analyses on sensitivity, technical efficiency and scenarios

Objectives

This chapter provides guidance on how to:

- Assess the robustness of the estimates to the inputs chosen and assumptions made (sensitivity analysis).
- Identify potential efficiency gains to be achieved and how these could impact the unit costs of a specific intervention (technical efficiency analysis).
- Evaluate how the technical changes within the analysis or external factors will affect total costs and financing needs. (scenario analysis).

Methods

- Identify key parameters that might change and would affect the total costs. These changes may result from fluctuations in input prices, input quantities, changes in the production process, or changes in coverage.
- Translate these potential variations into quantified changes in prices, quantities, processes and coverage.
- Apply changes individually and together to gain insights into the impact of uncertainty or efficiency gains on unit costs and total costs/budget needs.
- Comparing baseline and scenario estimates to evaluate impacts of assumptions and efficiency interventions on intervention costs and total resource needs.

Output

- Identification of areas of uncertainty that may affect costs and their potential impact on the cost estimates.
- A set of proposals for alternative implementation approaches that could improve technical efficiency in terms of the impact of input prices and quantities, or coverage on unit cots.
- What these changes mean for total budgetary needs.

Principal actors

- NSP develops teams and TWG intimately familiar with the details of how the programme is implemented to generate analyses for modelling and assess feasibility of efficiency changes and likelihood of different scenarios.
- The costing team, who apply the analysis and interpret the impact on unit and total costs.

Corresponding workbook tabs

4.1 Efficiency.
4.2 Sensitivity and scenario analysis.

10.1. Introduction

Previous chapters focused on how to generate estimates of unit and total costs. This chapter reviews these costs from three dimensions:

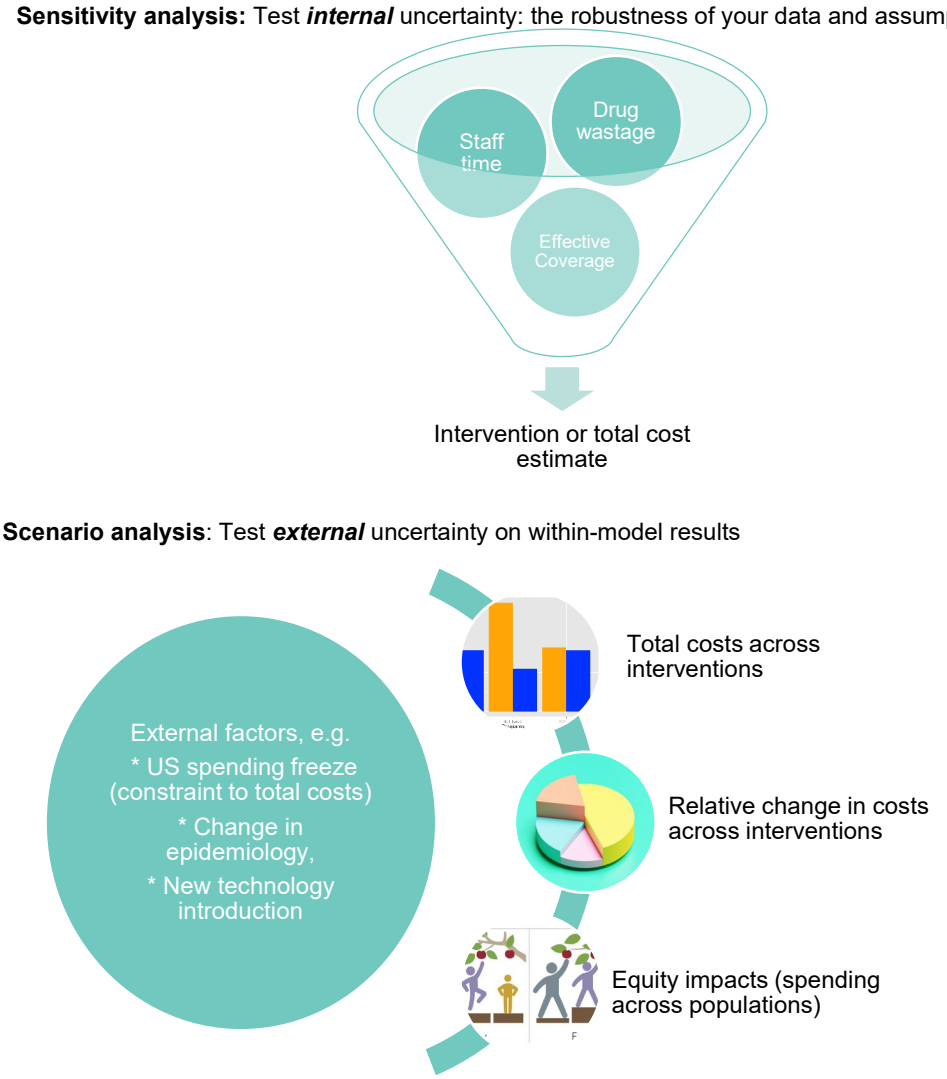
(1) **Sensitivity analysis.** A sensitivity analysis evaluates the robustness of cost projections to the assumptions and methodological choices the team made throughout the analysis. This analysis becomes particularly important when there are multiple plausible unit costs available, or several options for adaptations, as is often the case. The sensitivity analysis tests how much difference the assumptions make in the unit or total cost projection. This can be done with a one-way sensitivity analysis which tests each assumption one by one, or a multivariate analysis where all of the most optimistic or most pessimistic assumptions are applied to estimate the best- and worst-case impact on total costs.

    Realistically, many countries may have only a single unit cost to choose from. Therefore, sensitivity analysis is not recommended for all cost inputs – rather focus on a few unit costs, in particular those that: are big ticket items (i.e. that contribute a large share of total costs currently or likely to do so in the future); and contain a high level of uncertainty in the cost estimates, such as new interventions.

(2) **Efficiency analysis.** Technical efficiency analysis aims to either produce more outputs / coverage with the same costs or reduce costs while producing the same outputs. This looks at both the composition of resources used and how they are used to deliver the HIV response throughout the system, from removing constraints at the top-level policy or supply chain downstream to how and by whom frontline interventions/services are delivered. In this analysis, we conceptualize how the interventions will be delivered under different configurations, such as varying staff (task-shifting or task-sharing), changing drugs, frequencies of laboratory tests and client visits. Additionally, supply or demand side bottlenecks are examined, such as improving medical supply import and logistics systems, improving the drug procurement systems, or introducing user-centred demand creation to increase the uptake of services that will better utilize the fix costs of service provision.

(3) **Scenario analysis.** This brings the changes across input prices, demand and coverage together to understand how the budget will change and may or may not be conducted on the total cost estimates. It is practical and focuses on the costs that the key providers will bear. It informs total affordability of the NSP when compared with available resources.

Figure 10.1. Sensitivity analysis versus scenario analysis



While the aims, inputs to be changed and interpretations of sensitivity, technical efficiency and budget impact analyses differ, the mechanics of how the analyses are done are similar. By varying the inputs (input prices and intervention quantities, processes, or coverage), the team can evaluate their impacts on the unit and total costs. The complex part is not the mechanics but rather to identify, with the NSP development team, which scenarios are worth exploring, and how to change the parameters for each scenario. These parameters may be variations in:

- Prices.
- Input quantities, or mix, within the activities or intervention.
- Scope of activities conducted to deliver an intervention.
- Variation in output quantities, i.e. in population coverage of the intervention, anticipated rate of scale up over the period, or epidemiological changes.

This chapter starts with a more detailed overview of the different types of analysis and how to identify the inputs to change and by how much (i.e. what range of changes are plausible). It also

describes how to interpret the results to inform the NSP process. It then presents a practical approach to undertaking these analyses in a spreadsheet.

10.2. Sensitivity analysis

“As not all data are available precisely, it is usually necessary to make a number of assumptions throughout the data collection and analysis process. To understand the impact of these assumptions on the total cost results, one can use a sensitivity analysis. A sensitivity analysis indicates how the total cost estimates would react to percentages changes across the range of the assumptions. This helps to check the robustness of the assumptions, and the unit cost results” *(1)*. A large variation suggests a lot of uncertainty in the estimates, meaning decision-makers must be cautious in relying on these estimates for planning or policy decision-making. To reduce this uncertainty, the team may need to collect more information.

When conducting a one-way sensitivity analysis, a single parameter is changed while keeping others constant to understand the impact of that specific change on overall cost estimates. If, for instance, the team would like to isolate the effect of personnel cost on the estimated cost of provider delivered HIV testing, then one can change only this parameter (personnel)—that is, from the original 20% staff input to 30%, and then see what happens with the unit costs and its impact on total costs. This type of analysis is called one way sensitivity analysis because one parameter is changed at each time. In contrast, a multiway sensitivity analysis refers to two or more parameters changing simultaneously *(2)*, to assess the combined effects of these changes *(3)*.

To identify which assumption to test in the sensitivity analysis, consider the level of uncertainty contained in each, as follows:

- How different were the input cost estimates that were identified in the literature review? Were there many estimates with a very wide range (more than 25% different from each other)?
- Were there parameters for which it was impossible to obtain observed data, or that were from a very different setting? This may result in having to ‘guestimate’ the value or base it on key informant interviews. Examples include uptake and retention rates for new interventions.
- Estimates, such as those collected from a secondary source without having access to the primary source, of which the quality may be questionable, might be included in a sensitivity analysis.
- Assumptions around trends in future costs, i.e. are prices constant, increasing or even decreasing, as observed with ART and HIV test kits.

In the case of NSPs, the team should take a common-sense approach and focus on parameters with potentially large cost implications in the intervention, i.e. that currently, or in the future will, consume a large part of the total budget. Examples of inputs that may have a large impact on costs are ART, human resources, diagnostics or other commodities, laboratory services and programme management. ART is an intervention that needs more attention as it tends to be the largest cost category in HIV programming. Above service level costs tend to be another large cost contributor, which can vary significantly, and thus worth exploring.

Tip: Identifying the parameters that need be explored early in the costing process will make sensitivity analysis far easier. These inputs can then be put in the ‘Assumptions’ list in an Excel workbook in the Background Tab as named cells. If the team links their formulas to these cells, they will feed into all parts of the analysis. By changing that single named cell, the impact can

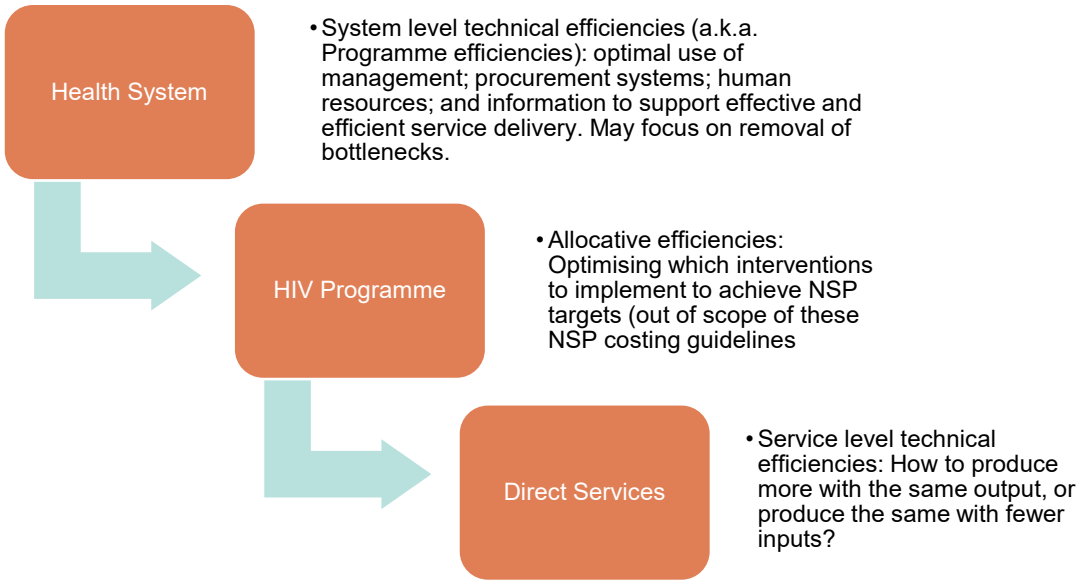
be immediately evaluated. From there copy and paste the 'values' into the sensitivity analysis table. But do not forget to change it back to the central assumption when the sensitivity analysis is finished.

The next section describes the analysis of technical efficiency and how to identify opportunities for improving technical efficiency.

10.3. Technical efficiency analysis

So far, we have considered interventions that continue in their current configuration or follow current guidelines. In this section, we consider how changes to business as usual can improve the efficiency of the HIV programme. In discussions with programme teams, the costing team will need to identify how programmes might change to make them more efficient by, for example, streamlining the system, removing bottlenecks on the supply (delivery side) or the demand, access, uptake and retention side and/or exploring in more detail how interventions themselves are implemented. Key definitions are given Figure 10.2

Figure 10.2. Key definitions of efficiency



There are two types of efficiency. First, *allocative efficiency* looks at which interventions should be implemented, i.e. how much should be spent across each of the intervention. It seeks to achieve a greater health outcome (i.e. HIV infections averted, deaths averted, DALYs) by optimally reallocating resources across interventions rather than within interventions. While allocative efficiency requires/assumes technical efficiency, it adds an additional criterion to achieving it: minimizing inputs to generate the *greatest health outcome*. This is usually done using mathematical modelling to capture the dynamic effects of interventions on the HIV epidemic in terms of ultimate health outcomes for HIV (new HIV infections and HIV deaths). The optimization across interventions will then be generated within the model. Nevertheless, the costing team still has a role to play in allocative efficiency by summarizing the existing cost effectiveness and value for money evidence data *at the start for the NSP teams* to use as evidence in support of their target and priority setting exercises, so that the best mix of interventions to achieve optimal allocative efficiency is decided early in the NSP process. There should also be some analysis of the previous spending on the previous (just ending NSP) and their comparison with the NSP resource needs estimates (previous NSP costing) to show proportional allocative efficiency, as well as possible funding shortfalls. Ideally a NASA would

have been undertaken as part of the end-term review of the previous NSP, and some of the findings be referenced in the new NSP costing and financing section; it is important to 'course-correct' if there were obvious misalignments with what was thought to have been the optimal response.

The focus of this section is on *technical efficiency*. It describes the relationship between cost inputs (medicines, personnel, etc.) and health outputs (people tested, HIV positive people identified, people with viral suppression, etc.). Technical efficiency focuses on intermediate outputs, such as condoms distributed or HIV+ people identified, and which can be collected directly from service providers and routine monitoring and evaluation data. It looks at the least quantity of inputs to achieve the target output, or the highest output that can be achieved from a given number of inputs (or budget). This relates to a technical relationship between input quantities and outputs akin to the ingredients in a recipe. It is not only about input prices, for example, swapping branded for generic drugs or task shifting towards lower cadres of personnel, but also includes examining the processes of delivery, such as rearranging patient flows or visits, or moving towards multi-month drug dispensing, which changes the implementation processes and thus the resource quantities.

A technically inefficient programme can become more efficient (achieve better health outcomes with the same resources), by making changes within the production process, i.e. how the interventions are implemented. Finally, technical efficiency is not about reducing total costs but about reducing wastage. This can entail expanding activities to better use fixed resources, for example by introducing demand creation activities to more fully use service capacity. Here the focus is on improving outcomes within service level inefficiencies. Though the programme inefficiencies may be where the greatest inefficiencies are found and the cost savings related to alleviating them.

The previous NSP end-term review process should have identified possible inefficiencies, and the new NSP development team should explore these and make recommendations, that the costing team can then cost the 'improved' options, showing their potential savings. The costing team's task is to work with the country teams to identify where there are opportunities for improving efficiency and do the technical analysis of the changes to the programmes.

As in the case with sensitivity analysis, a rule of thumb is to start with the interventions that contribute the greatest share of the costs. Then move along to the smaller components that are due to be scaled up, which could become big ticket items in the future. Only then consider smaller items in the cost estimates for which changes would only have minimal impact on the total costs.

A diagnostic tool for identifying inefficiencies and solutions can be found in appendix Table 5.1, along with a few worked examples. Ideally much of this would already have been identified in the previous NSP end term review. The costing team may however be asked to coordinate this effort, though focus group discussions or interviews with key informants who know the system well. It is not the sole responsibility of the costing team. The process for identifying inefficiencies and solutions, and estimating their impact on addressing HIV and estimating the cost of the HIV response, include the following steps:

- Step 1: Qualitatively explore bottlenecks and inefficiencies.
- Step 2: Propose potential feasible solutions.
- Step 3: Quantify changes in terms of costs (price X quantities) and effects. This could be both supply side inefficiencies in the way interventions are delivered, or low demand resulting in inefficient use of fixed costs.

- Step 4: Reviewing the inefficiencies and solutions. Table A5.1 can be used to collate inefficiencies and solutions, then prioritize which to include in the quantitative evaluation. It will be necessary to prioritize the three to five that would likely most improve the technical efficiency of the HIV/AIDS programme in your country.

Once the prioritize efficiencies have been identified in a smaller group, make sure to present these to the relevant TWG and receive feedback on the feasibility of the proposed solutions and your assumptions. If implemented, it will need to be recognized how they will impact different service providers, both positively and negatively. We need to consider how everyone can be brought on board to improve service efficiency to prevent stakeholders undermining the process of change. Secondly, review if there are any risks to service quality, and how these could be monitored and averted. It may in the end only be possible for the costing team to explore very obvious inefficiencies, such as relating to higher than expected drug prices, which the team can then translate into overall savings or how many more people could receive ART with a given budget.

Following the responses to this exploratory work, the inefficiencies and solutions can be quantitatively modelled. To do so, use Tab 4.1 to list all the parameters that will be affected. Then, intervention by intervention, look at the effect on unit costs, and finally the effect on total costs.

Workbook Tab 4.2, Efficiency Analysis. is set up to explore the impact of addressing the inefficiencies identified and solutions proposed in terms of the impact on unit and total costs for a specific intervention using the following four steps:

- Step 1: Review the inefficiencies and solutions.
- Step 2: Identify the top three to five that likely lead to the greatest efficiency gains, both on the size of the inefficiency and the ease of realizing the solution.
- Step 3: Identify which inputs change as a result, and the impact on the interventions unit costs.
- Step 4: See the impact on the total cost over time attributable to the change.

Finally, remember that efficiency is not about reducing total costs but making better use of resources, and may entail increasing spending to achieve even better outcomes.

10.4. Analysis of scenarios affecting total costs

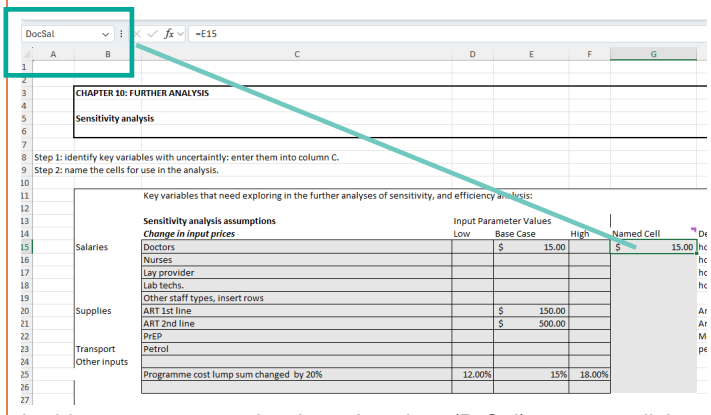
Moving from estimating the impact of changes to intervention costs to the total resource needs leads to the stage of evaluating the impact of different scenarios on total costs. This analysis captures the changes in technical efficiencies, but also looks at higher level scenarios, such as major programming or epidemiological changes and their impact on coverage and/or total resource needs. This can either be done in collaboration with the modellers, where the costing team provides changes in unit costs and requests changes to coverage and the model generates the impact on the project total costs over time. Alternatively, the team can work this through themselves using the results from Tab 3.3, NSP Total Cost, in the workbook. Based on these analyses, areas of uncertainty can be identified, and recommendations can be made for changes to programme implementation.

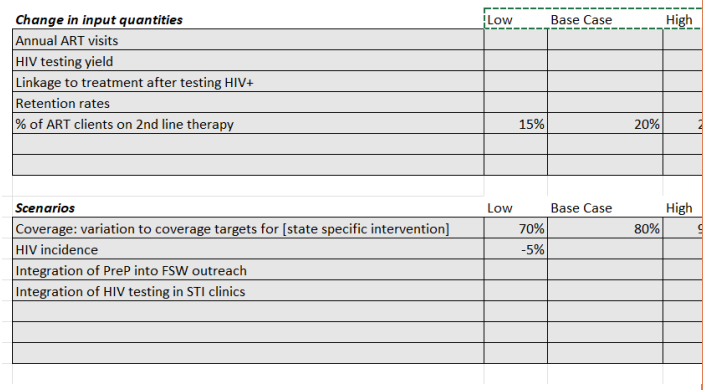
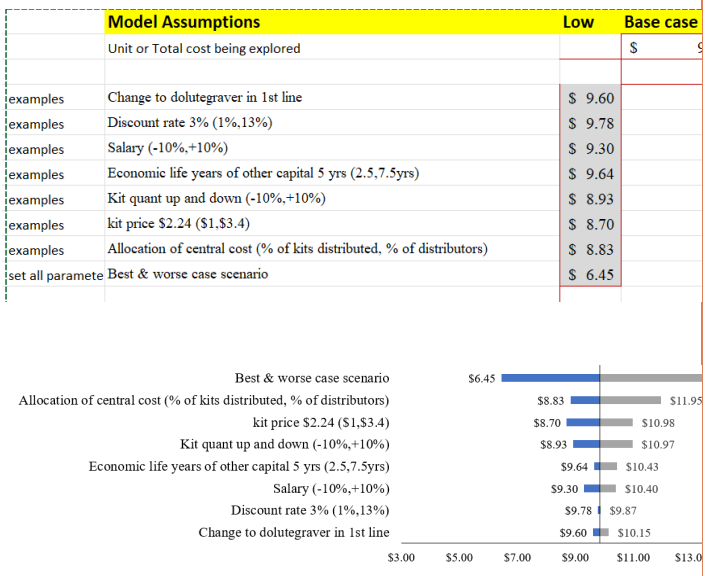
10.5. Technical steps to these further analyses

While this comes as the last chapter, it is critical to work this through *at the start* to identify which sensitivity analysis, technical efficiencies or scenarios the costing team will be exploring. This will allow the costing team to structure their spreadsheet inputs to facilitate analysis.

Now that the parameters have been identified to explore in these further analyses, the approach to analyzing their impacts on unit and total cost is a purely technical matter. The following steps will help to develop the scenarios and work them through to estimate the impact on either the intervention cost or the total cost (Table 10.1).

Table 10.1. Technical steps to analyse the impacts on unit costs or total costs.

1. Identify at the start of the NSP cost analysis which of your parameters (inputs) are likely most influential for current and future total costs.	Parameter buckets where there may be variation/changes to explore are: ▪ **Activities/processes:** Where the approach to delivering an intervention is substantially changed, e.g. facility to community-based HIV testing, activities (e.g. demand creation) are added or removed, vertical ART services are integrated into routine outpatient care. ▪ **Quantities of activities:** Differentiated service delivery reduces monthly ART visits to twice yearly visits for stable clients; the requirements for range or frequency of laboratory tests is reduced. This can also be on the demand side, where demand creation activities have increased uptake. ▪ **Prices:** Where less expensive inputs are used (e.g. task shifting or drug substitutions); drug prices are bulk purchased, negotiated down or shortages cause price rises. ▪ Coverage is changed. NOTE: Changes in processes and coverage result ultimately in changes to types of inputs, their quantities and prices.
2. Set up cells at the start for the inputs that will be varying so they are easily changed and are automatically updated across all formulas where they are used, in the red marked box.	Identifying the parameters that need be explored early in the costing process will make analysis far easier. These inputs can then be documented in the 'Assumptions' list in an Excel workbook in Background Tab (1.1) with their justification and entered in the top section of sensitivity analysis Tab (4.2) as a named cell. If the costing team links their formulas to these named cells in column G, then they will feed into all parts of the analysis. By changing that single named cell, the impact of that parameter can be consistently and immediately evaluated throughout the calculations. But do not forget to change it back to the baseline assumption when the sensitivity analysis is finished.  DocSal =E15 CHAPTER 10: FURTHER ANALYSIS Sensitivity analysis Step 1: identify key variables with uncertaintly: enter them into column C. Step 2: name the cells for use in the analysis. Key variables that need exploring in the further analyses of sensitivity, and efficiency analysis: Sensitivity analysis assumptions / Change in input prices — Input Parameter Values: Low, Base Case, High, Named Cell Salaries: Doctors $ 15.00 — $ 15.00 Nurses Lay provider Lab techs. Other staff types, insert rows Supplies: ART 1st line $ 150.00; ART 2nd line $ 500.00 PrEP Transport: Petrol Other inputs Programme cost lump sum changed by 20%: 12.00% 15% 18.00% In this case, to name the doctor's salary (DrSal), you can click on E15, then in the name cel (indicated by the green box on the image above) write the name you want to give to that cell.

	Then, when using the doctor's hourly salary in formulas, rather than referring to cell '=E8*…', you can now refer to '=DrSal*…' anywhere in the workbook and the value in E15 can be returned .
3. In the sensitivity analysis Tab 4.2, set up a table that has the main (base case) scenario, that includes the central assumptions that were used in the main estimation (either of unit cost, IHT inputs, or total costs), with additional columns for low and high estimates, The named cells are initially set to the base case, but in this analysis, they are changed to the low and/or high scenario values. This should calculate through, with the impact being seen on the intervention unit costs or on the total national projected cost .	 ***Change in input quantities*** Low Base Case High Annual ART visits HIV testing yield Linkage to treatment after testing HIV+ Retention rates % of ART clients on 2nd line therapy 15% 20% ***Scenarios*** Low Base Case High Coverage: variation to coverage targets for [state specific intervention] 70% 80% HIV incidence -5% Integration of PreP into FSW outreach Integration of HIV testing in STI clinics
4. Run each scenario by varying the input values: base case; low and high estimates, respectively, each time pasting the value of unit cost or total cost into the uncertainty analysis table using 'Paste special: values', to keep the total cost estimate for that specific analysis. Make sure to document which input variation goes with which total cost value. To evaluate the best and worst case scenarios, set all input prices to those values that generated the highest or lowest total costs. Aim to only explore three–seven major items. 5. If using the torpedo graph template, sort the values from high to low in column G, then a torpedo diagram will appear below, presenting both the one way and the multiway (best-worst) analyses. If there are problems with the formatting in the template there are ample YouTube videos to support correct torpedo graph formatting.	 **Model Assumptions** **Low** **Base case** Unit or Total cost being explored $ examples Change to dolutegraver in 1st line $ 9.60 examples Discount rate 3% (1%,13%) $ 9.78 examples Salary (-10%,+10%) $ 9.30 examples Economic life years of other capital 5 yrs (2.5,7.5yrs) $ 9.64 examples Kit quant up and down (-10%,+10%) $ 8.93 examples kit price $2.24 ($1,$3.4) $ 8.70 examples Allocation of central cost (% of kits distributed, % of distributors) $ 8.83 set all paramete Best & worse case scenario $ 6.45 Best & worse case scenario $6.45 Allocation of central cost (% of kits distributed, % of distributors) $8.83 $11.95 kit price $2.24 ($1,$3.4) $8.70 $10.98 Kit quant up and down (-10%,+10%) $8.93 $10.97 Economic life years of other capital 5 yrs (2.5,7.5yrs) $9.64 $10.43 Salary (-10%,+10%) $9.30 $10.40 Discount rate 3% (1%,13%) $9.78 $9.87 Change to dolutegraver in 1st line $9.60 $10.15 $3.00 $5.00 $7.00 $9.00 $11.00 $13.0

6. Identify which of the inputs or efficiency analyses have the strongest impacts on total costs and what that means for programming.	▪ Sensitivity analysis: Are more data needed to narrow the potential range and have more certainty around the estimate? ▪ Efficiency analysis: Can the proposed efficiency changes feasibly be implemented? ▪ Scenario: What is the cost of not fully implementing the NSP: use this when presenting the results.
7. Do not forget to reset the value in the named cells back to the baseline value so the main analysis is maintained.	
In an efficiency analysis, the proposed changes to the programme may not have a minimum and maximum value but can just as easily be modelled through to unit and total costs over the timeline of the NSP.	

Now, using the summary tables and figures the results can be used to inform decision-making. If there are input parameters that need more certainty, then more data need to be collected to narrow down the variation.

For the sensitivity and efficiency analyses, these results are now shared with the stakeholders to make a plan on:

- Which NSP scenario is most feasible, while recognizing the cost of not implementing the full NSP.
- How the recommended efficiency changes can be introduced.

There are many more sophisticated statistical approaches to evaluating model uncertainty, but these go beyond what is feasible in the context of projecting resource needs for NSPs.

10.6. Conclusions

In this chapter, we have provided guidance on how to explore variation in resource needs due to uncertainty in the inputs to the analysis or due to external factors such as changes to funding availability, or changes in programming to improve efficiencies. It is important to present the results simply and clearly to the stakeholders to convey what changes could realistically be made to improve outcomes or reduce costs and are operationally and politically feasible.

References to Chapter 10

1. Gold MR, Siegel JE, Russell LB, Weinstein MC, Eds. Cost-effectiveness in health and medicine. New York: Oxford University Press; 1996.
2. Claxton K, Sculpher M, McCabe C, Briggs A, Akehurst R, Buxton M, et al. Probabilistic sensitivity analysis for NICE technology assessment: Not an optional extra Health Econ. 2005; https://doi.org/10.1002/hec.985.
3. Terris-Prestholt F, Santos S, Sweeney S, Kumaranayake L. The rapid syphilis test toolkit. Implementation 1: guidelines for cost effectiveness analysis of syphilis screening strategies. 2011. https://globalhealthdiagnostics.tghn.org/site_media/media/articles/IMPLEMENTATION1.pdf

Chapter 11: Packaging the cost analysis for use

Objective

- This chapter aims to provide tools and guidance to support clear reporting of the cost estimates to strengthen the translation of the cost analysis into usable and interpretable results for the range of NSP stakeholders, to ensure adequate resource mobilization to ensure the success of the NSP.

Methods

- Starting with the Transparent Reporting and Analysis for Costing (TRAC) checklist, the team receives guidance on systematically documenting the methods of analysis, including data sources, analytical methods and assumptions.
- The report structure includes key questions that each section needs to answer and guidance on how to present this coherently to the stakeholders, so it is easy to interpret for policy use.
- The review checklist supports structured and critical self-review of the product deliverables.
- Finally, guidance on validating the results with stakeholders is provided, ending with a list of the key deliverables of an NSPC cost analysis.

Outputs

- TRAC checklist.
- NSP costing review tool.
- Costing narrative chapter or report.
- Guidance for validating results with stakeholders.

Principal actors

- Costing team.
- Assignment focal points.
- NSP development team and stakeholders.

Corresponding workbook tabs

1.1. Background.
5.1. TRAC checklist.
5.2. Results summary.

11.1. Introduction

Having projected the total costs of the NSP and explored potential scenarios that can affect intervention specific and total costs, the next steps are to review, report and use these results. This chapter discusses how to:

- Present the results that are needed for policy and planning clearly (with Workbook Tab 5.2. Results Summary).

- Interpret the results to facilitate stakeholder use of the estimates for policy.
- Present the methods transparently (with Appendix 5.1. TRAC checklist, and workbook Tabs: 1.1. Background; 2.4. Common Ingredients; and 5.1. TRAC).
- Critically review the quality and validity of the work before sharing the results (Appendix 5, Reviewing checklist)
- Validate the estimates with stakeholders and adjust them based on feedback.
- Submit the final results chapter or report with full methodological appendices and spreadsheets.

The key users of the cost estimates are the rest of the NSP project team, the NAC, the MoH, development partners, and future cost analysis teams.

Accompanying this chapter in the workbook and in appendices are:

- Templates for standard results tables and figures that can be included in the main NSP narrative showing key results of the cost projections; there are a few additional templates that are important but are more suitable for inclusion in an appendix
- The TRAC checklist, where the methods are clearly documented (Tab 5.1).
- An NSP costing report reviewer checklist to also be used as self-review tool prior to submission and by reviewers to evaluate the quality of the costing.

11.2. Presenting and interpreting key results

Despite collecting the costing data and undertaking extensive analysis, a critical area where the costing effort can often go wrong is in the presentation and interpretation of results. Whether the costing is embedded within the larger NSP report or is a narrative report on its own will determine the level of detail to be included, but the general structure is presented in Box 11.1.

Box 11.1. NSP costing chapter narrative structure

Background and setting: What do we know so far and what are the key gaps? Include here what the past NSP project and its projection of resource needs. Present any inefficiencies that were identified from the last NSP. Were any NASAs undertaken and what expenditures were reported?

The key questions for the cost analysis to address include:

- **Methods**: A section explaining and justifying methods, including defining the scope of the analysis, the timeframe, the data used, and the approaches that were used to estimate unit costs and project the total resource needs. Which items used the adaptation approach, which used ingredients-based costing and where lump sums were estimated or a percentage mark-up was used. The year in which the costs estimates are presented. A good rule of thumb is that there needs to be enough detail in the methods (though details can go in the appendix if there are restrictive word counts) to allow someone else to replicate the analysis.

- **Results**: The results include intermediate analyses, presenting estimated coverage across different interventions and estimated unit costs. Then the projected total resource needs are presented by strategic objective, intervention area, population and year, and including both total resource needs in monetary values and percentages across interventions and/or populations and by year. It can also be helpful to include sectoral totals and percentages across different ministry budgets, e.g. health, education and social services.

- **Discussion:** This section is critical to put the results in context:
    - If presenting a costing by ingredients, do the shares make sense? For treatment, commodities would be expected to be the largest component, for example. If it is not, this should be explained.
    - Are highly cost-effective interventions receiving the right amount of funds allocated?
    - Are the estimates higher or lower than past NSPs? If so, what explains this large difference?
    - Resource needs are usually higher than achieved expenditure. How did the past NSP resource need projections compare with the NASA of the matching year? This can help identify resource needs gaps and absorption bottlenecks.
    - How do the annual unit costs by intervention area compare with the literature, with the NASA's calculated units of expenditure (for certain interventions), or with neighbouring countries' unit costs, and reasons for any variations? Are there any circumstances that explain these or have some input costs been missed or double counted?
    - Is the share of total costs by intervention or population aligned with the priority areas in the NSP narrative?
    - Do resource needs projections across populations align with their size, or their incidence, or prevalence? Do expenditures across regions align with populations sizes, incidence or prevalence? Are there any major inequalities that are apparent?
    - Are there recommendations on changing current implementation approaches to achieve efficiency gains, based on the efficiency analyses undertaking in Chapter 10?
    - What are the key bottlenecks to anticipate in its implementation? For example, does the country have sufficient human resources to implement the plan? Are there other key issues identified?
    - It is important to compare this with an analysis of the funding landscape. This is the time to understand how likely the full NSP will be funded, and how the programme will need to adapt to the major changes in the global financing architecture.
    - Remember to critically evaluate the limitations in the data collection or analysis, for example state where the optimal data were not available and how proxy estimates were obtained, and in which direction this is likely to bias the results.

11.3. The TRAC checklist

As stated in the Global Health Cost Consortium guidelines: "cost estimates, including the methods used, should be communicated clearly and transparently to enable decision-maker(s) to interpret and use the results" *(1).* Transparent reporting is an essential part of ensuring quality and maximizing the usefulness of the cost analysis exercise. It ensures that the team document and justify their methodologies and assumptions, thus facilitating consistency by the team as well as external review for quality assurance and for building confidence in the results. Standard transparent reporting also enables future teams to build on the work of past NSP costings, allowing for greater use and appropriate adaptation of cost estimates. Ultimately, transparent reporting helps ensure that NSP costings are accurate, reliable and useful for decision-making. *The full checklist is presented in Appendix 5 and in Workbook Tab 5.1)*

Reporting purpose and overall methodology

Before delving into the specifics of the cost projections, the team must first provide an overview of the objectives of the costing exercise and general methodology used to frame the overall

work and approach. This follows minimum reporting standards for global health costings and helps to ensure that the overall purpose of the NSP costing is clearly specified and that the team's methodological choices are described and justified.

The required information is listed in the '1.1. Background' of the TRAC workbook. This sheet should be completed at the start of a costing exercise and the team can refer to Chapter 3 of the NSP costing guidelines for further details.

It is common practice for a specific chapter or annex of the final NSP to be allotted to the costing. Using the 1.1. Background' sheet of the workbook, the team can write up a brief and concise paragraph summarizing critical information including the overall purpose, perspective and scope of the costing, currency and base year of the reported costs, and overall cost types that were estimated for the exercise.

Common input prices

When building costs from scratch or adapting complete costs from the literature from other countries or years, it is likely that some basic input prices will be needed. These include human resource costs and supply inputs. Some activities may be used in multiple interventions, if applying an activity-based costing, such as the cost of meetings or trainings. It is important these are consistent across the analysis. Once compiled, it is also very useful for others adapting the analysis in the future. Tab 2.4. Common Ingredients provides a template to document these under the following headings: ingredient, measurement unit, ingredient unit cost, currency, source and assumptions. More data may be required to convert an input price to the required unit, for example annual salaries need to be adjusted to cost to company to capture the full cost that includes benefits, such as pension payments, housing, or uniform allowances. In the unit cost analyses, full annual costs may likely not be used, but may need make further estimates of the actual annual hours (or minutes) worked, accounting for leave days, national holidays and working hours, which need to be adjusted for lunch and coffee breaks, general administration time, etc. This fully loaded price per hour or minute is then what will be used in the ingredients—or activity-based cost estimates. It is necessary to document the sources and assumption(s) made to arrive at the input price. *This list must be submitted when closing out a cost analysis.*

Reporting unit cost estimates

After completing the general methodology and summary of the costing approach, the team should include a summary table of the costed interventions, unit cost estimates, and methodologies used. This table should begin by clearly reporting which NSP interventions were included in the cost projection, and which were not. This is important for transparency and helps stakeholders understand the scope and limitations of the analysis. Misunderstandings at this stage can lead to misallocation of resources or unrealistic expectations during implementation. This review of interventions—aligned with the NSP's structure and priorities—should be initiated early in the costing process (see Chapter 5), and if the costing workbook was used, can be summarized from Tab 1.4. Work Tracker.

For each intervention included in the costing, the team should then report:

- The estimated unit cost and total value, clearly specifying the currency and year.
- The unit of output (e.g. per person tested, per person-year on treatment).
- The method used to estimate the cost, such as ingredient-based costing, literature adaptation, lump sum, percentage of direct costs, or a combination (specify).

- The source(s) of cost data, including full citations for published and grey literature, or details on key informants (name, role, institution, and date of consultation).
- The scope of the cost estimate, including whether it reflects incremental, full at service level, or full above-service-level costs.
- Any adaptations or assumptions applied to the cost estimate (e.g. adjustments for inflation, scale, specific inputs), along with relevant notes.

Documenting this information is not only critical for transparency and validation, but also ensures that the costing can be replicated, updated, or adapted in the future. The final TRAC summary will be important for reviewers, stakeholders and, in the future, the team. It ensures that the costing exercise is not only technically sound but also clearly communicated, reusable, and grounded in traceable evidence (Table 11.1).

Table 11.1. NSP costing alignment

Intervention	List every intervention listed in the planning document
Objective	What intervention category does the intervention belong to?
Sub-objective	What programme area does the intervention relate to?
Included in costing?	Specify whether the intervention in NSP was included in costing or not. If not, justify.
Estimated cost value [YYYY] [Currency]	Value of estimated cost and specify currency and year in column header.
Output unit	Per measure of output (example: per person tested).
Method for estimation	Unit cost adapted from literature (**adaptation approach**), unit cost modelled from ingredients-based costing, **lump sum** or **% of direct costs, or combination** (specify).
Source(s)	Identify source(s) used. If **published** source, input study author, year, and DOI. If **unpublished** documents (grey literature), input title, year, author, if available website, date accessed. If **key informant,** specify role and institution, date discussed.
Scope of unit cost	Specify whether the cost estimate is: **incremental** (includes only marginal costs), **full at service level** (includes all direct and central costs incurred at delivery point), **Full at above-service level** (includes costs incurred above the service level, e.g. programme management, central procurement).
Notes	*Any other information important to the interpretation of how the unit costs were estimated.*

In the workbook, an optional set of additional columns has been included under the “Additional Details’ section of the TRAC tab. These are provided at the team’s discretion, but may be particularly useful for internal tracking, peer validation, or for external audiences—such as modellers or a future NSP costing team—who may need more specificity about the methods used. These columns cover details such as the target population, specific activities, and whether the unit cost was modelled or observed, financial or economic, full or incremental, as well as inputs included or excluded, inflation adjustments, ingredient-specific adaptations, and any other assumptions or methodological notes. While not all members of the team may choose

to complete these fields, doing so enhances the transparency, replicability, and long-term utility of the costing exercise.

Box 11.2. Transparency in cost reporting

> Many of the projected cost estimates will be informed by estimates synthesized from diverse sources, assumptions and programmatic context. The emphasis here is not in achieving perfection (the perfect unit cost does not exist and is transient), but rather in transparently documenting and justifying each decision. Transparent reporting will help you, in case you are later asked to make revisions to your analysis. But the reason this is a required deliverable is to ensure clarity for the policy-makers and other users of the cost projects, reviewers and the broader audience, fostering an understanding of the rationale behind the chosen methodologies and assumptions. This, in turn, will enable a larger community of the team to build and improve on each other's work.

11.4. Self-review of analysis and results: Reviewer's checklist (A6.2)

Though this discussion of reviewing one's own results comes at the end of this guide, keeping track of the assumptions in the TRAC checklist and critical review of the quality and robustness of the data, assumptions and methods is critical throughout the costing analysis. The reviewer's checklist can help guide and structure the analysis, and the TRAC checklist can support robust cost analysis, including critical review of the input data, as well as assumptions and systematic tracking of them. For example, while primary cost input data are being collated at the start, it is important to review whether the scope and scale of the intervention actions are similar between the input cost data and the target intervention, if the cost estimates align with the needs of the NSP costing or need adjustment to make them relevant to the current NSP scope. The more different in scope, setting or time, the more adjustments are needed for the costs to align with the NSP objectives. The reviewer's checklist takes a high-level overview to critically review the content of the estimation approach and report along six NSP dimensions, following the recommended structure of the costing chapter/report (the full checklist is presented in Appendix 6.2):

- General structure and content.
- Costing methodology and assumptions.
- Data quality and sources.
- Analysis of results.
- Funding, financing gap and sustainability (if included in the TORs).
- Reporting and presentation.

Once the final chapter has been reviewed, but before final submission, the team can use a review checklist to review your work and make sure all areas have been adequately addressed. The review template is structured to allow a discrete ranking of how well the analysis meets standards, as graded by insufficiency, meets expectations, or needs improvement. If there are criteria that the costing team knows they have not been able to satisfy, this is the place to flag it for discussion. In this case, comments should be provided on why this is the case, or an explanation is needed for how it is outside the scope of the analysis. It might be that with help from the wider group it can still be addressed. It is better to flag any limitations or challenges in advance, than for the reviewers to identify outstanding items and return it to the costing team.

11.5. Validating the NSP costing estimates

A transparent, iterative, deliberative and stakeholder-inclusive validation process of the NSP costing estimates ensures broader buy-in from stakeholders regarding the results of the projections from the costing exercise. This is done by reviewing the quality of the unit costs used, the assumptions made and the robustness of the costing tools, and reviewing the preliminary costs results with stakeholders at least twice before finalizing the analysis.

Ongoing validation

As mentioned in Chapter 3, at the beginning of the costing exercise, it is beneficial for the costing team to create an email list for the costing steering committee and others (using workbook Tab 1.2) . The costing team can provide regular updates regarding the costing process, including a summary of cost-effectiveness evidence from the initial priority setting phase, actions taken to generate or curate intervention unit costs, and the relevant assumptions and challenges faced. During this process, the costing team should regularly pose questions for opinions and guidance to the members, encouraging their feedback and insights. Keeping the identified group engaged throughout the process is crucial for effective, ongoing validation.

The costing team should seek a designated costing focal point within the identified steering group. This person will serve as a steward for the other group members and play a practical role in guiding the costing processes. During the final meeting, their active involvement will foster a sense of ownership through leadership among the steering committee members and broader stakeholders.

Preparations for the final validation meeting

In preparation for the final validation meeting, the costing team must ensure that the draft of the cost narrative report is complete and that the costing workbook and TRAC checklist have been populated and updated during the initial ongoing validation process. Once the meeting date is determined, the costing team, in collaboration with the cost focal point, is responsible for creating the meeting agenda, presentations and practical worksheet activities for validation.

The selection of stakeholders to attend the validation meeting is the preserve of the TWG secretariat and often includes the steering committee members, members from the broader TWG, and invited stakeholders. As the cost capacity of the participants varies, the costing team must ensure that the validation exercise is moderately technical to remain understandable by everyone.

It is good practice to share the agenda, the narrative report, and the workbook with all participants with adequate time for review before the meeting. The agency leading the NSP, e.g. MoH or the NAC, often takes responsibility for inviting stakeholders to this meeting and sharing the required costing files. To increase participation and deliberations, the costing team should support the designated lead from the Ministry in drafting guidance on the costing files to help participants review the outputs before the meeting.

Validation meeting

In the final validation meeting, the costing team should take a supportive role, allowing the costing focal point and the secretariat to lead, thus enhancing ownership. During the session, the costing team must present the methods used to establish the unit cost, the assumptions made and the guidance from the steering committee. It is crucial to uphold transparency and evidence-based, deliberative principles throughout the validation process. Rather than using PowerPoint throughout, the costing team should steer workbook and narrative report

discussions with subgroups of the participants, itemizing key worksheets that enhance the perceived quality of the process and highlighting challenges faced and the guidance obtained to address them. Additionally, they should show that the costed strategic objectives align with the strategic framework and confirm that all interventions and activities are accounted for in the costing exercise. The costing team is responsible for presenting the process, assumptions, results, analysis limitations and potential areas for future improvements. The team should encourage discussions and share practical experiences from the process.

Incorporating feedback and finalizing estimates

The final step in validation involves synthesizing stakeholder recommendations and feedback. Ideally, the session should be led by the focal point or a TWG member who will move the motion to adopt the NSP cost estimations while encouraging suggestions for improving current and future processes. After the feedback is incorporated into NSP costing, the revised narrative report, the workbook and the TRAC checklist should be shared with participants to demonstrate transparency and responsiveness to suggestions. This also ensures that stakeholders have the NSP cost estimates for their repository and future use.

11.6. Submitting the final deliverables

With the analysis completed, validated and disseminated, the final step is to submit the completed package of NSP deliverables:

- The narrative cost report, either as part of the full NSP report or as a stand-alone NSP costing report.
- The Excel workbook that was used.
- The TRAC checklist:
- These documents provide key information that will facilitate review and expedite closure of the assignment.
- Self-completion of the reviewers' NSP costing quality checklist, confirming item by item that all key items have been included and reported clearly.
- If the ToR includes mentoring of an emerging economist, then the mentoring review should also be submitted, both by the senior and the emerging economist, if contracting consultants.

11.7. Conclusion

The process of generating full resource need projections alongside NSP and other strategic planning documents have been presented in the past 10 chapters of these guidelines. While the focus has been on HIV, the methods presented largely hold for other areas in health. The success of addressing the burden of disease in countries relies on realistic planning and programming, which cannot be done without accurate cost projections. This guideline has presented methods for projecting costs that can be done under tight timelines and provides a range of options for estimating these costs depending on what primary data are available, whether or not this is done alongside epidemiological modelling or using specific costing software such as the Resource Needs Model, useful for HIV specific costings, or the Integrated Health Tool, ideal for broader health sector planning, or completed only using the accompanying workbook. Regardless of the software used, these guidelines and the workbook provide tools for planning, analysing and presenting the analysis. This guideline has also emphasized the importance of collaborations with the NSP development team and broader stakeholders from the start of the NSP exercise and ensuring continuous engagement and

validation throughout the process. This is important to ensure alignment and realism. By providing value for money evidence to the NSP team at the start, the costing team can support improved prioritization.

While historically NSPs have been outsourced to international and national consultants, it is anticipated that this will increasingly be integrated into national planning processes and costing expertise and capacity will strengthen domestically. It is the hoped that these guidelines can support this change and facilitate new the team to develop skills in projecting accurate costs in the strategic planning process.

References to Chapter 11

1. Vassall A, Sweeney S, Kahn JG, Gomez G, Bollinger L, Marseille E, et al. Reference case for estimating the costs of global health services and interventions. GHCC Stakeholder Group, Kate Harris, Carol Levin, 2017. https://ghcosting.org/pages/standards/reference_case.
2. Turner HC, et al. Adjusting for inflation and currency changes within health. Econ Studies Value Health. 2019;22(9):1026–1032.
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Glossary

Key programme terms	
Activities	Tasks or actions carried out as part of an intervention. Activities are the building blocks of an intervention and are themselves composed by quantifiable resources or ingredients. They are measured by immediate outputs, such as number of persons trained, or number of promotional messages diffused.
Intervention	A set of actions or activities designed to achieve a desired objective within a programme. Interventions are often evidence-based measures evaluated by quantifiable outcomes, such as number of persons sensitized or number of persons newly tested positive.
Investment case	An investment case is a strategic planning document that examines a subset of prioritized interventions and models how these may, in turn, be implemented to different populations and geographical areas to achieve the greatest level of impact. It also investigates critical factors such as health access, delivery, quality, efficiency and financing. It is different from an NSP, which includes a large overview of national interventions and more often is focused on a smaller time frame.
Key populations	UNAIDS considers gay men and other men who have sex with men, sex workers and their clients, transgender people, people who inject drugs, and prisoners and other incarcerated people as the main key population groups. These populations often suffer from punitive laws or stigmatizing policies, and they are among the most likely to be exposed to HIV *(9)*.
National strategic plan	A national strategic plan (NSP) is a comprehensive strategic planning document that outlines a country's strategic approach to addressing a specific health area. It serves as a framework to help coordinate and guide a multi-sectorial response. The NSP is developed through a consultative process with a range of national, public and private, political and civil society stakeholders. The NSP presents the country's goals, objectives, strategies and targets over a period of several years. It includes an analysis on the resources required to implement the plan.
Programmes	A coordinated set of interventions aimed at achieving a specific goal or outcome. Programmes are designed to address a complex issue and may involve multiple approaches. For example, HIV testing can be achieved via HIV self-testing, index testing, point of care testing, provider-initiated testing and counselling, etc.
Programme support functions	Above-service level activities that serve to manage and track the national HIV/AIDS response. Examples include collecting and reporting strategic information on the HIV epidemic, strengthening health systems and laboratory systems.
Societal enablers (also critical enablers)	The conditions and factors within a society that facilitate social exclusion, marginalization, criminalization, stigma and health inequity. Programmes that address societal enablers seek to overcome major barriers to service uptake, equitable coverage, rights-based delivery and quality care.
Vulnerable populations	Defined by each country's unique social and epidemiological contexts. May include: adolescent girls and young women (AGYW), adolescent boys and young men (ABYM), pregnant and breastfeeding women, children or infants exposed to HIV, partners of people living with HIV (PLWH), partners of women attending antenatal care (ANC), victims of sexual assault, people with disabilities (PWD), orphans and vulnerable children (OVC), or uncircumcised men living in high prevalence areas.

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Appendix 1: Costing guidelines for HIV and their scope

Resource	Scope of HIV interventions	Synopsis
Costing guidelines for HIV prevention services *(1)*.	HIV prevention services.	Description on how to conduct ingredient-based costing using a sample of observations.
A step-by-step methodological guide for costing HIV/AIDS activities *(2)*.	HIV/AIDS interventions, all.	Description on how to conduct activity-based costing using a sample of observations.
HIV/AIDS home-based care costing guidelines *(3)*.	Home-based care for people living with HIV.	Description on how to conduct ingredient-based costing using a sample of observations.
Manual for costing HIV facilities and services *(4)*.	Facility based HIV services.	Description on how to conduct ingredient-based costing using a sample of observations.
User guide for the HIV-related human rights costing tool *(5)*.	HIV-related human rights activities.	Step by step instructions on use of specific costing tool.
PrEP costing guidelines *(6)*.	PrEP.	Review of costing principles.
Guidelines for costing of social and behaviour change health interventions *(7)*.	Social and behavioural change.	Review of costing principles.
GHCC reference case principles *(8)*.	Not HIV specific.	Reference for the key principles of costing health interventions.
Costing guidelines for tuberculosis interventions *(9)*.	TB/HIV interventions.	Guidance and associated tools for estimating observed unit costs of TB/HIV services exclude above service cost estimation.
This guide.	Direct HIV services, indirect programme support activities, and interventions addressing societal enablers.	Description on how to rapidly conduct cost projections using secondary sources of information on intervention cost.

Appendix 2: HIV interventions in the Integrated Health Tool

HIV/AIDS interventions in the Integrated Health Tool	Target group	Comments
Prevention		
Female sex worker (FSW) HIV prevention (new name)	FSW	
FSW PrEP	FSW	
Male sex worker (MSW) HIV prevention (new name)	MSW	
MSW PrEP	MSW	
Gay men and other men who have sex with men (preferred term to MSM) HIV prevention	Gay men and other men who have sex with men	
Gay men and other men who have sex with men PrEP	Gay men and other men who have sex with men	
Transgender HIV prevention (new name)	Transgender	
Transgender PrEP	Transgender	
People who inject drugs (PWID) outreach/peer education	PWID	
PWID PrEP	PWID	
PWID needle and syringe exchange programme (NSEP)	PWID	
PWID opioid substitution therapy	PWID	
Prisoner PrEP	Prisoners	
Prisoner NSEP	Prisoners	
STI treatment		This is an aggregate indicator for STI used to link to Goals
Prevention of HIV through counselling and provision of condoms and lubricants		
Adolescent girls and young women PrEP	10–24 years	
Comprehensive sexuality education (adolescents)	10–19 years	
Voluntary medical male circumcision	Men 15–49 years	
Adult female PrEP	Total female pop. 15+	
Adult male PrEP	Men 15–49 years	
Post-exposure prophylaxis (PEP)	Total population	
Testing, treatment and care		
HIV testing	(Currently in the OneHealth Tool software: 15–49 years)	This is first time testing/initial diagnosis
Adult treatment (Male)		Treatment includes in-care diagnostics and laboratory costs
Adult treatment (Female)		Treatment includes in-care diagnostics and laboratory costs

Paediatric treatment	0–18 years	Treatment includes in-care diagnostics and laboratory costs Includes cotrimoxazole for children
Social enablers		
Enabling legal environments ▪ Legal literacy ('Know Your Rights') • Advocacy support and capacity building for community-led organizations, ▪ Increasing access to justice • Paralegal services ▪ Ensuring rights-based law enforcement practices: • Training of law enforcement ▪ Improving laws, regulations and polices relating to HIV and HIV/TB: • Review of laws and law enforcement practices to gauge impact • Training and sensitization of: judges, lawyers; parliamentarians; community leaders including religious leaders		
Reduction of stigma and discrimination ▪ Reducing human rights related barriers to services ▪ Eliminating stigma and discrimination in all settings ▪ Ensuring non-discriminatory provision of health care • Community-led monitoring		
Reduction of harmful gender social norms and promotion of gender transformative approaches ▪ Reducing HIV related gender discrimination, harmful gender norms and violence against women and girls in all their diversity ▪ Increased sexual autonomy of adolescent girls and women of all ages ▪ Reduction in harmful masculinities ▪ Prevention of gender-based violence against adolescent girls, women living with HIV, people living with HIV, transwomen and men, sex workers, users of drugs (including women users of drugs), gender diverse individuals ▪ Prevention of intimate partner violence ▪ Supporting women's leadership		
Social protection ▪ Socioeconomic support for orphans and vulnerable children ▪ Economic empowerment or cash transfers ▪ Food and nutrition programmes		

Appendix 3: Efficiency diagnostics tool and worked example.

A3.1. Diagnostic tools for efficiencies

The following checklist is intended to support the team's review of documents and discussions with the stakeholders and country teams. To identify inefficiencies, it is recommended that the costing the team become fully versed in documents that are likely to be relevant to this process, including previous strategic frameworks, mid-term evaluations, PEPFAR Country Operational Plans (COPs), budgets, relevant costing studies, etc. Most of the questions in this checklist will not be answerable solely by the costing team but instead will require consultation with other experts and relevant stakeholders, in particular members of the TWGs.

While this is referred to as a checklist, it is not intended to be used merely to indicate yes or no for each of the questions, but rather to guide the process of fully understanding the themes that are most relevant for the NSP process. The checklist responses identified are intended to guide the team to collect relevant information, identify any gaps or barriers that exist and incorporate essential data into the next costed NSP, considering issues of equity and efficiency. The first part consists of questions that can help identify common inefficiencies in HIV programming and provides some structured guidance for your interview. These questions form part of the package of materials that the costing team should share at the start of the NSP process to guide the NSP teams through possible programme changes that could be introduced to improve their programme.

The matrix in Table A5.1 is a systematic checklist to guide identification of inefficiencies along the full HIV cascade. It requires the team to do more probing and requires critical thinking to identify both the problems as well as solutions with the key stakeholders who know the system well. It has a wider scope allowing for more country specific inefficiencies to be identified.

Semi-structured interview Section 1: Key questions for stakeholder discussions to identify opportunities for efficiency gains

The following questions are intended to identify areas of technical efficiencies and inefficiencies. Technical efficiencies should include not only the way that services are directly delivered but also address issues of programmatic management (are resources inadequate or excessive for managing and sustaining the programme?) and supply chain management (is the current delivery of commodities appropriate for the needs of the country?). For these questions, we expand on the systematic review of key areas for efficiency gains in HIV programming by Shahid et al. as follows *(1)*:

(1) In the budget for the existing NSP, what are the most expensive components? Which intervention makes up the largest share of the budget? *These are likely the areas for greatest efficiency impact*.

(2) What percentage of all HIV/AIDS funds are allocated to programme management? How does this compare to other similar countries? How are these distributed to the different levels of the system?

- Are there plans to either increase or decrease programme management costs as a percentage of the entire NSP cost?
- How will these resources be allocated to/deducted from programme management?
- What are the risks to programme implementation quality of reducing the management at different levels of the system?

(3) What concerns currently exist regarding having a fully functional supply chain system for the delivery of HIV services in the country? Where is the weakest link? For example, how long does it take commodities to clear customs, then be delivered to central and regional warehouses and to facilities? Are frontline stock-outs frequently reported?

- How will these concerns be addressed in the new NSP?

(4) What opportunities exist for combining HIV interventions with other HIV prevention measures (e.g. integrating PrEP into programmes for adolescent girls and young women or other health programmes (incorporating HIV programmes into noncommunicable disease, child, maternal, sexual and reproductive health and rights (SRHRs), TB and Covid-19 interventions)?

- What data, if any, suggest that this could result in increased efficiency?
- To what extent would this affect the costs of each respective intervention? Can certain overhead costs be shared across programmes?
- May combining programmes increase reach and service uptake?

(5) Could any of the interventions be delivered more efficiently if they were led and provided by community-led organizations (CLOs)?

- If so, which interventions and how would this affect the costs of providing these services?
- Would there also be a change in quality and quantity of coverage?
- Can this be quantified?

(6) Could any of the interventions be delivered more efficiently if they were provided at a community-based location rather than in a facility?

- If so, which interventions and how would this affect the costs of providing these services?
- How would this affect service uptake?
- Would there also be a change in quality of coverage? Can this be quantified?

(7) Have the most efficient service delivery models been adopted, including:

- Targeted testing and prevention to the highest incidence populations, geographical regions, and age groups (for voluntary medical male circumcision).
- Are universal prevention of vertical transmission measures in place?
- Is HIV self-testing available in high burden, low coverage testing settings, with support for linkage to care?
- Are interventions delivered by the most appropriate level of staff? It should be noted that while task shifting to lower cadres may appear to save costs, it is not efficient if the quality or uptake of services drop, so careful monitoring of impact will need to be proposed.

- Are there steps in the processes that could be streamlined, for example by reducing the numbers of visits or the number of health care workers attending to clients at each visit? Reducing the number of required laboratory tests?
- Are different staff members experiencing gaps in their workdays due to low demand from clients/users?
- Are all the needed supplies, drugs and diagnostics in stock and available?

(8) In reviewing the treatment programme, what are the existing interventions that could be leveraged to make it more efficient? Past examples that have had large impacts were the introduction of: multi-month scripting, differentiated service delivery, changing ARV drug regimens, etc.)?

(9) Are there plans for expanding of PrEP, or provision of PrEP as a vaginal ring, or as long acting, injectable PrEP. These programmes will need close evaluation to understand opportunities for efficiency gains in practice: for them to increase efficiency, there would need to be gains in uptake and/or adherence, as they will likely have higher unit costs, at least in the short term.

(10) Demand constraints: Where are staff not optimally used due to low service uptake and is there an obvious way to increase client uptake/create demand, with the aim of more optimally using staff resources?

(11) Do you need more resources to make any of these services more efficient (e.g. adding demand creation will add new costs, but can lead to reduced unit costs if uptake increases, leading to better use of resources such as personnel)?

While the above list is likely to capture most opportunities for technical efficiency gains, it may not capture broader inefficiencies or dimensions of inefficiency that have not yet been previously identified. Table A3.1 provides a systematic discussion guide for the costing team to use in discussions with the study team and frontline implementer

Table A3.1. Diagnostic tool for eliciting inefficiencies with the NSP team and frontline implementers

Intervention inefficiencies across the cascade	Identify challenges in implementation that are leading to sub-optimal provision	Solution		Impact: How will this change the coverage, scope of activities (process), input quantities, or prices? Indicate increase/decrease, include reference to evidence of impact
		Process: How can the implementation process be changed to achieve a greater impact at similar cost?	**Price**: How can the inputs be swapped to lower cost inputs without reducing the quality?	
Health system level inefficiencies				
Programme management				
1. International				
2. National				
3. Regional				
4. District				
5. Site				
6. Community				
Human resources				
Doctors: can some functions be carried out by less qualified staff without risking quality?				
Nurses: can some functions be carried out by less qualified staff without risking quality?				
Lay providers: can some functions be carried out by less qualified staff without risking quality?				
Laboratory technicians: can some functions be carried out by less qualified staff without risking quality?				
Other staff:				
Supply chain				
▪ Customs clearance				
▪ Distribution to warehouse				
▪ National warehouse to site				

Intervention inefficiencies across the cascade	Identify challenges in implementation that are leading to sub-optimal provision	Solution		Impact:
		Process: How can the implementation process be changed to achieve a greater impact at similar cost?	**Price**: How can the inputs be swapped to lower cost inputs without reducing the quality?	**How will this change the coverage, scope of activities (process), input quantities, or prices?** **Indicate increase/decrease, include reference to evidence of impact**
▪ Information systems and requests				
▪ Pharmaceuticals				
▪ Laboratory equipment				
▪ Laboratory consumables				
▪ Other medical supplies				
Societal enablers				
▪ Advocacy				
▪ Addressing stigma and discrimination				
▪ Addressing discriminatory and punitive laws				
▪ Addressing gender inequality and gender-based violence				
▪ Social protection provision				
Intervention level inefficiencies				
▪ Outreach to sex workers				
▪ Outreach to gay men and other men who have sex with men				
▪ Outreach to transgender populations				
▪ Outreach to people who inject drugs				
▪ Needle and syringe programmes				
▪ Outreach to prisoners				
▪ Interventions with adolescent girls and young women				
• Interventions with adolescent boys and young men				

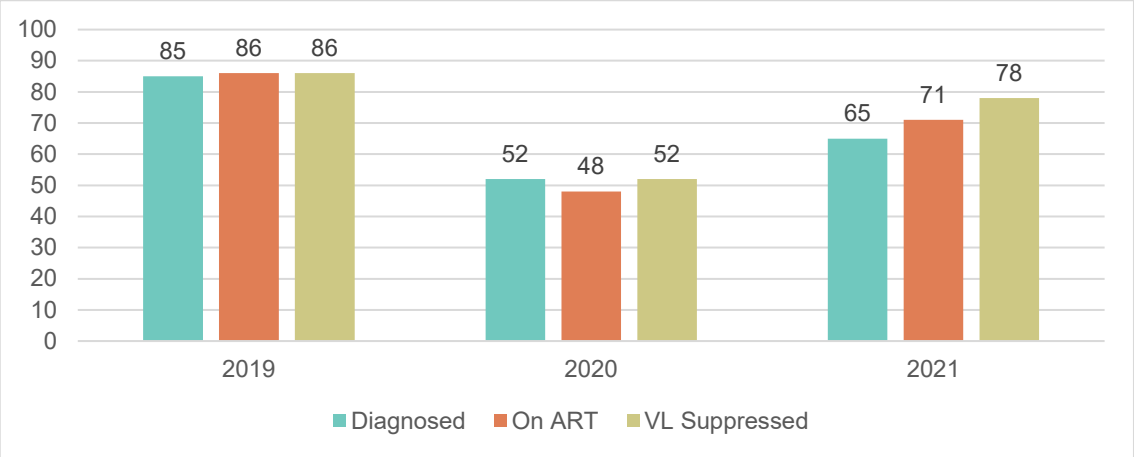
Intervention inefficiencies across the cascade	Identify challenges in implementation that are leading to sub-optimal provision	Solution		Impact:
		Process: How can the implementation process be changed to achieve a greater impact at similar cost?	**Price**: How can the inputs be swapped to lower cost inputs without reducing the quality?	**How will this change the coverage, scope of activities (process), input quantities, or prices?** **Indicate increase/decrease, include reference to evidence of impact**
▪ Sexually transmitted infection screening and treatment services				
▪ Pre-exposure prophylaxis				
▪ Post-exposure prophylaxis				
▪ Voluntary medical male circumcision				
• Fixed				
• Mobile				
• Infant				
▪ ART for adults				
• New initiations				
• Stable				
• Unstable				
• Retention support				
▪ ART for children				
▪ HIV testing services (HTS)				
• Provider initiated testing services				
• Voluntary counselling and testing				
• Mobile testing services				
• Index partner testing				
• HIV self-testing				
• Support for orphans and vulnerable children				
• TB preventative therapy				
• Other				

Intervention inefficiencies across the cascade	Identify challenges in implementation that are leading to sub-optimal provision	Solution		Impact:
		Process: How can the implementation process be changed to achieve a greater impact at similar cost?	**Price**: How can the inputs be swapped to lower cost inputs without reducing the quality?	**How will this change the coverage, scope of activities (process), input quantities, or prices?** **Indicate increase/decrease, include reference to evidence of impact**
Are there additional interventions which are being explored in the country that are not listed above?				
Intervention type				
Targeted population/geographical area				
Trade-offs to be explored: where are resources being shifted from? How will this affect other services?				

A3.2. Example of a worked efficiency analysis

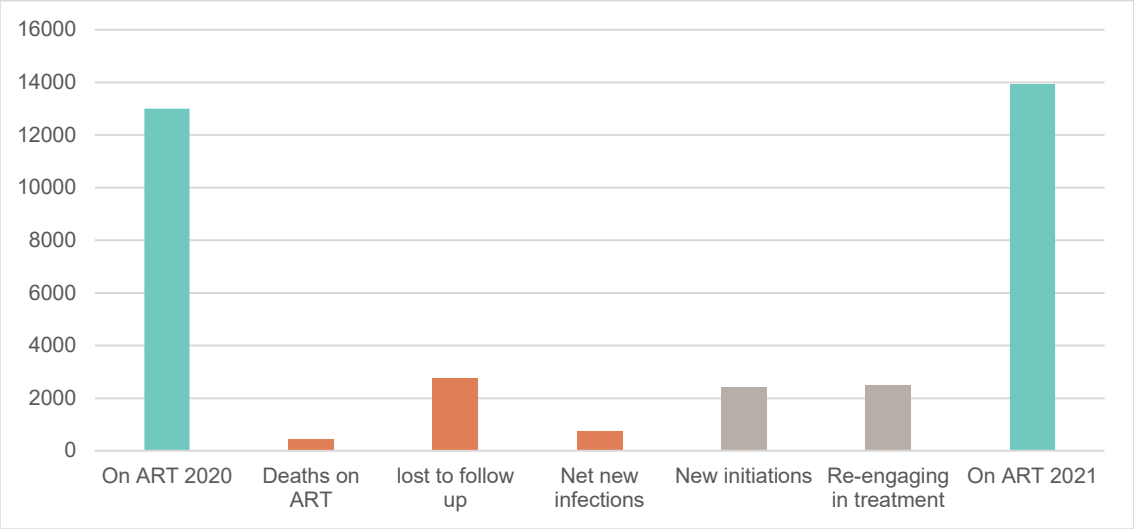
The examples presented are from the 2022 Jamaica investment case. In 2021, the Jamaica investment case analysis of the treatment cascade identified a large gap between people diagnosed and people on ART. Once on treatment, viral suppression appeared to be better (Figure A3.1).

Figure A3.1. Jamaica treatment cascade, 2019–2022 *(2)*



Reviewing further, it was clear that only looking at the ART rates from year-to-year masks the in and outflow of clients on ART. Figure A3.2 shows there is high lost to follow-up and a great deal of effort is spent re-engaging clients into treatment. If retention could be improved, not only would the health outcomes be better (reducing the number of people needing expensive second line treatment), but resources would also not be lost with re-engaging clients into treatment.

Figure A3.2. ART coverage dynamics, Jamaica Investment Case, 2021



To demonstrate the impact of improvement in the efficiency of retention services, the impact of a change in the percentage of people stable on ART was modelled. The current estimate for clinical categories for treated people living with HIV/AIDS in Jamaica is 79% stable on treatment, with a further 11% in their first year of treatment and 10% designated as unstable on treatment.

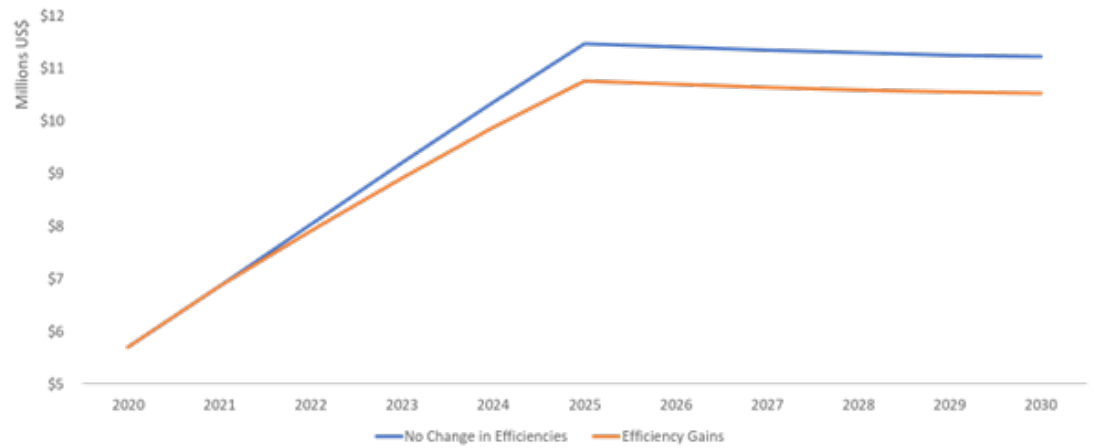
Based on a literature review, a potential solution was to move towards a more client-centred facility delivery approach by reducing waiting times and introducing community-led ART clubs among those stable on treatment (Table A3.2).

Table A3.2. Review of treatment retention service models

Intervention	Country	Impact	Reference
Adherence clubs	South Africa	57% reduction in long term follow-up (LTFU) 67% reduction in virological rebound	Luque-Fernandez *(3)*
Facility based versus community-based ARV distribution	Uganda	74% reduction in LTFU with community-based ARV distribution	Mpiima *(4)*
Community ART groups (CAGs)	Mozambique	87% reduction in LTFU relative to baseline	Decroo *(5)*
Adherence clubs	South Africa	67% reduction in risk of LTFU	Grimsrud *(6)*
Community ART groups and treatment clubs	eSwatini	12-month retention was generally high (82.2%), especially with treatment clubs (90.4%)	Pasipamire *(7)*
Community treatment initiative	Nigeria	88.1% six-month retention for those receiving intervention versus 78.5% among those on standard treatment	Katbi *(8)*

In a hypothetical modelling scenario, assume that the cost of current retention costs $20 per person per year and 80% of people are on first line ART. To move this to community ART groups would be $25 per person per year, but it would improve the share of people on first line ART to 85%. If first line ART is $150 and second line ART is $500, then the change would reduce the average ART cost from $240 to $227 per year. Using the modelling output, this can be estimated as the impact on total projected costs (Figure A3.3).

Figure A3.3. Cost impact of treatment efficiencies



This could result in a five-year savings of $5 million, not to mention the improved effects on clients in terms of time saved on health-care visits and improved health outcomes.

References to Appendix 3

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Appendix 4: Transparent reporting and analysis for costing (TRAC) checklist

	Cell header	*Cell description*
Baseline reporting (minimum reporting for NSP)	Intervention	*List every intervention listed in the planning document*
	Objective	*What NSP objective does the intervention relate to?*
	Sub-objective	*What NSP sub-objective does the intervention relate to?*
	Included in costing?	*Specify whether the intervention in NSP was included in costing or not. If not, justify.*
	Estimated cost value (YYYY) [Currency]	*Value of estimated cost and specify currency and year in column header*
	Output unit	*Per measure of output (example: per person tested)*
	Method for estimation	*Unit cost adapted from literature (adaptation approach), unit cost modelled from ingredient-based costing, lump sum or % of direct costs, or combination (specify)*
	Source(s)	*Identify source(s) used. If published source: input study author, year, and DOI. If unpublished documents (grey literature): input title, year, author, if available website, data accessed. If key informant: specify role and institution, date discussed.*
	Scope of unit cost	*Specify whether the cost estimate is: incremental (includes only marginal costs), full at service level (includes all direct and central costs incurred at delivery point), full at above-service level (includes costs incurred above the service level, e.g. programme management, central procurement)*
	Notes	
Additional details (optional)	Target populations	*Specify population the intervention seeks to target*
	Activities	*Specify activities that make up each intervention*

	Cell header	*Cell description*
	Modelled/observed	*Was this unit cost modelled based on how the intervention should work or valued based on observed implementation?*
	Financial/economic	*Is this cost financial (an expenditure) or economic (includes values for donated goods and services)?*
	Full/incremental	*Does this include only the extra costs to add it on to existing services (incremental) or include the full cost of all activities needed to run the intervention including a shared costs (full).*
	Included inputs	*Specify the resources included in the cost estimate (e.g. supplies, transport, direct service-level human resources, etc.)*
	Excluded inputs	*Specify any resources excluded from this unit cost*
	Adjusted for historical inflation?	*Was this estimate adjusted for historical inflation? If not, justify.*
	Adapted cost for specific ingredients?	*Was this estimate adapted for differing ingredients or costs? If yes, specify how.*
	Other adaptations (scale, output, other)?	*Where other adaptations made? If yes, specify*
	Assumptions or notes	*Specify what assumptions were made and data manipulations applied for estimate.*

Appendix 5: Tools for managing a national strategic plan costing assignment

A5.1. Terms of reference for costing of the national strategic plan for HIV/STI/viral hepatitis

Please find below a draft terms of reference to be adapted to the country context, at the very least complete the missing fields indicated by [….].

BACKGROUND

The Ministry of Health (MoH), through the National AIDS and Control (NAC) programme, has initiated a process to finalize the draft health sector HIV/STI/viral hepatitis NSP that was developed in […….*fill in country ……].* The NSP will be in line with global vision and recommendations, the National Health Sector Strategic Plan (NHSSP), the national *[… specify scope of conditions, e.g. HIV/STI/hepatitis B ……*] epidemiological context as well as health system dynamics in a devolved context and universal health coverage (UHC).

The NSP finalization process entails the following:

- Reviewing baseline evidence on costs and cost-effectiveness *of [insert condition, e.g. HIV/STI and viral hepatitis]* interventions to inform the NSP development process.
- Reviewing the draft health sector HIV/STI/viral hepatitis NSP based on the current programmatic, political and socioeconomic context of the country.
- Reviewing the appropriateness of the monitoring and evaluation indicators against the overall goal of the [*insert country name]* AIDS Strategic Framework.
- Ensuring stakeholder participation in the finalization of the NSP.
- Updating the draft NSP, including the monitoring and evaluation (M&E) framework and plan, and considering evidence on the impact, costs and cost-effectiveness to prioritize interventions
- Developing an implementation and communication plan of the NSP
- Costing the HIV/STI/viral hepatitis NSP

CAPACITY BUILDING OF THE COSTING TEAM

Building the capacity of emerging cost the team is an integral part of the Technical Support Mechanism (TSM) professional development strategy, especially where this can be done in alignment with the principles of South–to–South peer learning. On the job training—including mentoring and coaching—has been shown to be an effective form of capacity development, moving knowledge out of the theoretical into the real world. Senior costing team play a pivotal role in mentoring and supporting emerging the team with a focus towards on the job training and support.

The approach to mentoring and coaching is combined with on-demand training and peer learning sessions (online) to complement the work being done on assignments. In addition, resources are provided to both the mentors and mentees (lead and emerging team) while on assignment to assist them in making the most of the experience.

THE ASSIGNMENT

Purpose of the assignment

The team will work with NAC and stakeholders to inform development of initial cost-effectiveness of the different interventions (a priori) to inform priority setting and then estimate the total costs of implementing the *[insert condition, e.g. HIV/STI and viral hepatitis]* NSP as it is finalized. This will include the cost of monitoring progress towards the national *[insert condition, e.g. HIV/STI and viral hepatitis]* targets.

Methodology and specific tasks for the team

The task will be undertaken through costing analyses and discussions with NAC, partners and stakeholders, including other players in the MoH. Specifically, the team should undertake the following tasks:

- Discuss and confirm the scope of the analyses, costing approach and methods, presentation of cost estimates, scheduling and details of the actions with NAC, partners and stakeholders.
- Conduct an in-depth desk review of secondary resources assessing best practices related to the costing of NSPs. The sources should include: UNAIDS; WHO; published expert analyses; and reports on financing trends for public, private and donor sources. Share this review with the relevant NSP stakeholders to provide cost-effectiveness evidence to inform priority settings of the different NSP working groups.
- Participate in inception and progress meetings.
- Select or develop a robust costing tool which meets minimum standards for accuracy and transparency and seek approval from the client/beneficiary/stakeholders.
- Determine cost estimates for each priority area for the NSP, including actions to monitor progress towards national *[insert condition, e.g. HIV/STI and viral hepatitis]*
- Work closely with NAC and stakeholders to address comments and inputs to the draft NSP

In the context of the costing project, the senior costing team should facilitate the following activities:

- Together with the emerging team, identify their needs in terms of capacity building in relation to the costing assignment.
- Agree on specific capacity building tasks that will be implemented to address some of the identified needs given relevant opportunities presented by the implementation of the costing project.
- Identify project tasks for completion by the emerging team that respond to capacity building needs.
- Quality review the outputs from emerging team project tasks and provide detailed and constructive feedback.
- Conduct an end of assignment debriefing that reflects on the success of the capacity building efforts and facilitate the completion of a feedback survey.

Deliverables

- Inception report that clearly captures the team's understanding of the HIV/STI/viral hepatitis problem globally and locally, financing landscape analysis and overall trends in financing in [*insert country name*]. In addition, a list of current interventions in place and

those on the horizon for introduction with a rapid review of the existing evidence on costs and cost-effectiveness for each intervention.

- Draft the financing and sustainability chapter of the NSP.
- *[insert condition, e.g. HIV/STI and viral hepatitis]* NSP resource requirements (resource needs, availability and gap); and costed *[insert condition, e.g. HIV/STI and viral hepatitis]* NSP M&E plan.
- Costing workbook detailing unit costs by interventions, population (database of unit costs and unit cost estimates with their data sources and assumptions as reported using TRAC.
- Slides for presentation during the validation meetings.
- Final consultancy report and completed reviewer checklist—used as self-review by team.
- Mentoring feedback survey (completed).

Duration of the consultancy

The consultancy is expected to start from [*insert start date*] to [*insert end date*]. The estimated duration for the consultancy is [*insert nr*] days for the senior team and [*insert nr*] days for the emerging team as outlined in Table A5.1.

Table A5.1. Duration of the consultancy

Output/ activities		No. of home days per team	No. of field days per team
Output 1	Detailed inception plan: Activities include kick-off mentoring meeting and goal setting.	[*insert nr*] days senior team and [*insert nr*] days emerging team	0
Output 2	Desk review of relevant strategies, policies and other supporting documents covering *[insert condition, e.g. HIV/STI and viral hepatitis]* and their costs and cost-effectiveness: Activities include quality assurance and mentoring of emerging team.	[*insert nr*] days senior team and [*insert nr*] days emerging team.	0
Output 3	Costing of the health sector/multisectoral strategy for *[insert condition, e.g. HIV/STI and viral hepatitis].* Activities include working with emerging team on mentoring goals and upskilling.	[*insert nr*] days senior and [*insert nr*] days emerging team.	[*insert nr*] days both Senior and emerging team.
Output 4	Costing report and workbook detailing unit costs by interventions and population (database of unit costs and unit cost estimates with their data sources and assumptions) using TRAC checklist. Mentoring activities as above.	[*insert nr*] days senior, [*insert nr*] day emerging.	
Output 5	Development of the financing and sustainability chapter in the strategy. Activities include quality assurance and mentoring of emerging team.	[*insert nr*] days senior team, [*insert nr*] days emerging team	
Output 6	Final consultancy report, with full workbooks, TRAC checklist and self-review checklist.	[*insert nr*] day for each team	0
Output 7	Mentoring feedback survey (inclusive of all mentoring activities).		0

During the process the team will be expected to carry out the following tasks (Table 5.2).

Table A5.2. Tasks to be carried out by the team

Task
Planning: ▪ Participate in planning meetings, including inception meeting. ▪ Contribute rapid cost-effectiveness evidence to the priority setting processes.
Internal review: ▪ Participate in an internal review. ▪ Facilitate an internal review workshop. ▪ Document feedback and recommendations for revision.
NSP development and validation meetings: ▪ Participate in strategy development workshops. ▪ Participate in financial sustainability work stream.
Costing of NSP: ▪ Facilitate the NSP costing workshops. ▪ Estimate resource requirements, available resources and the gap over a period of [*insert nr*] years. ▪ Draft the financial sustainability chapter in the NSP. ▪ Complete the TRAC tool and submit the cost analysis spreadsheets.
Report writing: ▪ Guide the report writing team in drafting the process report. ▪ Review the draft consolidated report. ▪ Revise the report based on comments.
Capacity building: ▪ Meet and identify capacity and skills development needs of the emerging team. ▪ Identify capacity building activities which address needs within the context of the assignment. ▪ Conduct regular check-ins to discuss the implementation of activities defined above. ▪ Conduct a structured quality review of the emerging team's tasks and provide feedback. ▪ Conduct a debriefing session at the end of the assignment. ▪ Participate in online TSM capacity building activities (emerging team only).

The senior costing team will lead the process while the emerging costing team will support the lead team to ensure all deliverables are met. The recommended qualifications of the team are as follows.

Senior team:

- Master's degree in economics, with a specialization in health economics, health policy and related field.
- Demonstrated experience in conducting health programme financial analysis, including strategic disease programmes in low and middle-income countries.
- Demonstrated experience in financing and costing of NSPs for strategic disease programmes. Experience in costing of HIV NSPs will be an added advantage.
- Proven track record of five years or more in health economics, health-care financing and/or health policy analysis.

- Fluency in written and spoken English

Emerging team

- A Bachelor's degree and a Master's degree in economics with a specialization in health economics, health policy and a related field.
- Demonstrated experience in conducting quantitative and financial analysis, including strategic disease programmes in low and middle-income countries.
- Demonstrated writing abilities evidenced by prior work.
- Demonstrated experience in financing and costing for strategic disease programmes.
- Proven track record of three years or more in health economics, health-care financing and/or health policy analysis.
- Demonstrated experience in supporting costing process or work.
- Knowledge of health-care system in [*insert country name*].
- Fluency in written and spoken [*insert required language, e.g. English*].

A5.2. NSP costing review checklist

This appendix provides a structured approached to reviewing a submitted an NSP cost analysis. The tools are shared with the team members at the start so they know what the expectations are and can work towards meeting them. It is recommended that the costing team submit this as a self-review beforehand, along with the narrative and costing workbook and TRAC tool to identify and address any gaps before it comes for review.

General structure and content

This section evaluates the overall structure and completeness of the NSP costing report (Table A5.3).

Table A5.3. Structure and completeness of the NSP costing report

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Does the costing report include the necessary sections? ▪ Introduction. ▪ Methods. ▪ Results. ▪ Discussion and recommendations.			
The executive summary provides a concise overview and does not add any new content.			
The table of contents and list of tables/figures are accurate and complete.			

Background and context

This section reviews the background and context of the NSP costing report (Table A5.4).

Table A5.4. Background and context of the NSP costing report

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Does the background place the current costing NSP within previous NSPs, reflecting the local and global targets and highlighting the local context affecting their attainment?			
Does an NSP costing context include an overview of the HIV response, funding of the response, funding gaps reported, key reforms, and opportunities for quality and efficiency improvements?			

Costing methodology and assumptions

This section assesses whether the costing methodology is sound, transparent and aligned with the purpose of the NSP and has been included in the narrative. These items should be explained in the narrative, with further details provided in TRAC checklist (Table A5.5).

Table A5.5. The costing methodology and assumptions

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Has the costing development process been described, including leadership, stakeholders and consensus validation? (Guidelines, Chapter 3.)			
Is using normative (as per country guidelines) or observed (real-world) input costs justified? (TRAC checklist and guidelines, Chapter 3.)			
Clear articulation of costing objectives (budgeting, gap analysis, resource mobilization, etc.). (TRAC checklist and guidelines, Chapter 5.)			
Has the costing perspective been described as the provider's perspective, and have the providers been specified? If not the provider's perspective, has this been justified? (TRAC checklist and Chapter 4.)			
Consideration of incremental versus full costs is explained (e.g. inclusion of shared resources) (TRAC checklist and guidelines, Chapter 4).			
Have any of the intervention's costs included in-kind contributions, such as donated goods and services, and have these explicitly been defined as economic costs? (TRAC checklist.)			
Are the assumptions about coverage, scale-up, inflation, the year, and the currency in which the value is presented clearly stated? (TRAC checklist and guidelines, Chapter 7.)			
The description of costing methods is transparent and detailed (e.g. adaptation approach and ingredients based) (TRAC checklist and guidelines, Chapters 7 and 8).			
Has any further scenario analysis been done and justified? (Guidelines, Chapter 10.) ▪ Technical efficiency (unit costs by intervention). ▪ Total budget constraint scenarios. ▪ Coverage scenarios. ▪ Other scenarios.			

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
▪ Total resource needs impact analysis (combined scenarios).			

Data quality and sources

This section evaluates the data sources used and the reliability of the data for the costing exercise. These items can be reported alongside the TRAC checklist items, whose items are included here for reference.

Table A5.6. Data quality and sources

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Unit cost estimates are fully referenced (TRAC checklist).			
Scan the data sources in the TRAC checklist and identify the robustness of the sources (less than five years, similar settings, population and scope of activities in the interventions) (TRAC checklist).			
Local data are prioritized or adjustments for international data are explained.			
Data gaps or limitations are acknowledged, and solutions or assumptions are provided.			
All unit costs are presented in the currency value of the first year of the NSP costing (past input prices are adjusted for inflation) (TRAC checklist).			
What is the duration of the costing exercise, the year when the costs are expressed, and are the currency conversion rate sources reported and justified? (TRAC checklist).			

Analysis of results

This section assesses the rigour of the analysis and the accuracy of cost projections by reviewing the costing workbook and costing consistency with strategic goals (Tables A5.7 and A5.8).

Table A5.7. Review of the costing workbook

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response

Is there a separation between inputs and calculations?			
Have the coverage numbers been checked for consistency between the overall NSP and the NSP costing?			
Are key calculation cells protected?			
Does the workbook provide a basic set of reports which agree with the results presented in the costing report?			

Table A5.8. Consistency of the costing with strategic goals

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Is the costing exercise integrated into the overall planning cycle of the NSP?			
Do targets in the costing workbook agree with coverage targets in the NSP M&E framework?			
Are projected resource needs realistic and feasible? (Has this been compared to previous NSPs and major shifts justified and validated with stakeholders or the broader NSP team?)			
Clear link between cost estimates and expected health outcomes (e.g. 95–95–95 goals)			

Funding, financing gap and sustainability (if included in the TORs)

This section typically describes the funding gap over the strategic planning period based on the total resource needs and expected funding from all sources over the planning period (Table A5.9).

Table A5.9. Funding gap over the strategic planning period

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Does the report's context describe funding trends for the epidemic response in the context of domestic and international funding, including the Global Fund and PEPFAR?			
Does the report anticipate projected funding for the HIV response, and are the assumptions clear? (Forecast contributions by donors and from domestic sources over the planning.)			

Does the report quantify the annual funding gaps for the NSP using the available funding and resource needs estimates?			

Reporting and presentation

This section assesses the report's clarity, format and usability for stakeholders and decision-makers.

Table A5.10. Clarity, format and usability of the report

Criteria	Use 'Insufficient' 'Meets expectations' 'Needs improvement'	Reviewer's comments	Costing team response
Is there a table presenting costs by intervention and year?			
Has the share of cost across the intervention areas been included?			
If included, have figures showing the impact of scenario analyses been included?			
Do tables and figures include clear titles and legends?			
The language is clear, non-technical and accessible to a broad audience.			

Overall evaluation

This section summarizes the overall strengths and weaknesses of the NSP costing report and provides recommendations for improvement (Table A5.11).

Table A5.11. Strengths and weaknesses of the NSP costing report

Overall strengths	Areas for improvement	Final recommendations of the report

Appendix 6: NSP costing course slides and videos

Please see the YouTube Playlist for videos and course slides:
https://www.youtube.com/playlist?list=PLm24qjjmwsqq9hXI41OcLiM1ZZIla_r4P

References to the Appendices

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Abbreviations and acronyms

AGYW	adolescent girls and young women
AIDS	Acquired Immune Deficiency Syndrome
ART	antiretroviral therapy
BIA	budget impact analysis
CEA	cost-effectiveness analysis
COP	Country Operational Plan (PEPFAR)
CSE	comprehensive sexuality education
FSW	female sex worker
GHCC	Global Health Cost Consortium
HIV	Human Immunodeficiency Virus
HIVST	HIV self-testing
IBC	ingredients-based costing
IC	investment case
IHT	integrated health tool
LMIC	low and middle-income country
MoH	Ministry of Health
MSM	men who have sex with men (preferred term: gay men and other men who have sex with men)
M&E	monitoring and evaluation
NAC	National AIDS Council
NASA	National AIDS Spending Assessment
NCD	noncommunicable disease
NHSP	National Health Strategic Plan
NGO	nongovernmental organization
NSEP	needle and syringe exchange programme
NSP	National Strategic Plan
OVC	orphans and vulnerable children
PEP	post-exposure prophylaxis
PEPFAR	US President’s Emergency Plan for AIDS Relief
PLWH	people living with HIV
PMTCT	prevention of mother-to-child transmission (preferred term: prevention of vertical transmission)
PrEP	pre-exposure prophylaxis
PWID	people who inject drugs
RNM	Resource Needs Model
SRHR	sexual and reproductive health and rights
TB	tuberculosis
TRAC	Transparent Reporting and Analysis for Costing (checklist)
TWG	Technical Working Group
UNICEF	United Nations Children's Fund
VMMC	voluntary medical male circumcision
WHO	World Health Organization

Suggested citation. Practical Methods for Projecting the Costs of National HIV Strategic Plans. Geneva: Joint United Nations Programme on HIV/AIDS; 2025. Licence: CC BY-NC-SA 3.0 IGO.

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