VACCINE PRIORITISATION AND PORTFOLIO OPTIMIZATION (VPOP) TOOLKIT OPTIMIZATION TOOL

Developed by the World Health Organization, in collaboration with UNICEF
Support and technical expertise from Development Catalysts

Contents

This guidance document is published as an interim version in January 2026 to support countries that may need to urgently address immunization budget challenges.

The final version will be published in Q2 2026, as part of the consolidated VPOP toolkit, building on lessons learned from early adopters. Good practices and practical tips will be added to facilitate implementation in other countries.

Glossary

Term	Definition
Booster Dose	Additional dose given after the primary series to sustain or enhance immunity
Candidate Vaccines	Vaccines being considered for future introduction as part of a prioritization exercise
EPI (Expanded Programme on Immunization)	The national program responsible for implementation, monitoring, and optimization of immunization schedules
MCDA (Multi-Criteria Decision Analysis)	A structured method for comparing options using multiple evidence-based criteria
NIS	National Immunization Strategy
NITAG (National Immunization Technical Advisory Group)	Independent expert body providing evidence-based recommendations on vaccine prioritization
Optimization process	Systematic structured process of improving performance, efficiency and cost-effectiveness of immunization services through changes in vaccine products and vaccination schedules
Optimization Change	The option selected for an optimization question when it differs from the current practice or configuration within the national immunization programme (e.g. switch of product, change of schedule)
Optimization Options	The possible solutions to an optimization question, assessed against criteria like cost, feasibility, and impact
Optimization Question	A specific issue raised during a portfolio review that requires appraisal (e.g., add a booster, switch a product). Examples can be found in the **OPTI 1.1 List of Optimization Questions** document
Portfolio Review	Comprehensive assessment of all vaccines and schedules currently in a program, serving as the starting point for optimization
Prioritization process	Systematic structured process of identifying, assessing, and ranking new or upcoming vaccines for possible introduction
Product Switch	Transition from one vaccine product to another
Schedule Adjustment	Modification to timing, frequency, or combination of doses
Sequencing	Ordering implementation of prioritized interventions (vaccine introductions and/or) switches over time, ensuring feasibility within financial and programmatic limits
Sequencing Scenario	A proposed sequence of new vaccine introductions and/or optimization changes based on defined assumptions, considering trade-offs between feasibility, impact, and resources

I. Context and background

National immunization programmes operate in an increasingly complex decision-making environment, characterized by a growing number of vaccine products, expanding delivery strategies across the life course, and rising expectations for equity, impact and efficiency. At the same time, countries face persistent constraints related to financing, health workforce capacity, cold chain infrastructure and competing health priorities, requiring more deliberate and forward-looking portfolio decisions.

These challenges are compounded by a broader context of heightened fiscal pressure on health systems. WHO has highlighted[1] that reductions in global health financing risk undermining essential health services, including immunization, and threaten progress toward national and global health goals. In this environment, countries must prioritize, protect and optimize the use of limited resources while ensuring that immunization programmes remain equitable, resilient and sustainable.

The Immunization Agenda 2030 (IA2030) calls for immunization systems that deliver for everyone, everywhere, across the life course and are integrated within primary health care. Achieving these ambitions requires not only the introduction of high-impact vaccines, but also systematic attention to how vaccines are selected, sequenced and delivered within real-world system and financing constraints.

In March 2025, the Strategic Advisory Group of Experts on Immunization (SAGE)[2] emphasized the importance of structured, evidence-based approaches to both prioritizing new vaccine introductions and optimizing existing immunization portfolios. SAGE encouraged countries to use explicit criteria, transparent methods and inclusive deliberative processes, led by National Immunization Technical Advisory Groups (NITAGs), to support coherent national decision-making aligned with national immunization strategies.

In this guidance, **optimization** refers to a structured, country-led and evidence-informed process focused on improving the use of **vaccines already included in the immunization programme**. Though both processes support priority-setting, optimization examines changes to existing configurations—such as product choice, presentation, schedule or delivery strategy—and sequences these changes to maximize impact, efficiency and sustainability within available resources. P**rioritization** primarily supports decisions on future **new vaccine introductions**.

This tool builds on the New Vaccine Introduction Prioritization and Sequencing Toolkit (NVI-PST) and other WHO guidance, including the PRIORITI Framework (see appendix C). It supports existing national decision-making processes led by the Expanded Programme on Immunization, NITAGs and ministries of health, and aims to strengthen the link between immunization policy decisions

[1] World Health Organization. WHO issues guidance to address drastic global health financing cuts. Available from: https://www.who.int/news/item/03-11-2025-who-issues-guidance-to-address-drastic-global-health-financing-cuts

[2] World Health Organization. Highlights from the SAGE meeting, March 2025. Available from: https://cdn.who.int/media/docs/default-source/immunization/sage/2025/march/sage_march_2025_highlights_final.pdf

and sustainable implementation through explicit consideration of trade-offs, feasibility and sequencing.

II. Objectives and key outputs

Objectives

The primary objective of an optimization process is for countries to make evidence informed decisions that are feasible and sustainable about their immunization portfolios over a defined planning horizon, usually 3 to 5 years. Optimization aims to ensure that vaccine policy decisions are aligned with national health priorities, system capacity and available resources, and that trade-offs between competing options are transparent and documented.

More specifically, optimization seeks to:

- improve the quality and transparency of immunization decision-making using explicit criteria and structured deliberation, leveraging evidence
- strengthen alignment between policy recommendations and implementation realities, including financing, supply and delivery capacity
- support country-led consensus-building among national stakeholders by providing a shared analytical and deliberative framework
- contribute to more realistic sequencing of vaccine optimizations and portfolio adjustments

Outputs

The outputs of an optimization exercise depend on its scope and configuration but typically include a combination of analytical and policy-oriented products. These may include:

- an optimization framework adapted to the national context, including decision criteria and, where relevant, some weight depending on their importance to the country
- a clearly defined and documented set of optimization questions
- exhaustive then ranked or preferred options for each optimization question, supported by evidence and deliberation
- sequencing scenarios that describe when and under what conditions changes or optimizations should occur, considering programmatic and financial constraints
- a consolidated set of recommendations endorsed through national processes and reflected in strategic and operational plans such as the NIS.

Evidence such as budget and financial impact of potential switches can often be key outputs of the process, especially when supporting funding applications to donors

Importantly, optimization changes are not an end in themselves. They are intended to inform national planning (e.g. NIS), budgeting, procurement and partner engagement processes. Optimization changes could be revisited as context, evidence and constraints evolve.

III. When to carry out an optimization exercise

Optimization exercises can be undertaken at different points in the immunization policy and planning cycle and are most effective when aligned with existing national processes. Strategic planning milestones, such as the development or revision of a National Immunization Strategy (NIS) or health benefit package design, provide a natural entry point to review the vaccine portfolio, assess system and financing constraints, and define a realistic sequencing roadmap.

Optimization may also be triggered by financing and funding cycles, including national budget preparation and external funding applications (e.g. Gavi), which require clear articulation of priorities, affordability and sequencing.

Procurement (including pooled procurement mechanisms like UNICEF Supply Division or PAHO Revolving Fund) and market-related events—such as tenders, contract renewals, changes in supply conditions, or the availability of new WHO-prequalified products—often prompt reassessment of product choices, presentations and delivery strategies.

Programme reviews identifying coverage gaps, operational bottlenecks or delivery inefficiencies, as well as global and normative developments such as new SAGE recommendations, changes in donor policies, budget reductions or emerging disease threats, may also necessitate optimization of the immunization portfolio.

Main triggers for initiating an optimization exercise include:

- development or revision of a National Immunization Strategy
- preparation of national budgets or Donors applications
- vaccine procurement or tender cycles
- identification of major programmatic bottlenecks or inefficiencies
- significant changes in global guidance, financing or market conditions

Countries that have conducted prioritization or optimization exercises recently, may consider updating regularly their decisions focusing on specific questions to take into account possible new context.

IV. How: overall approach and methodology

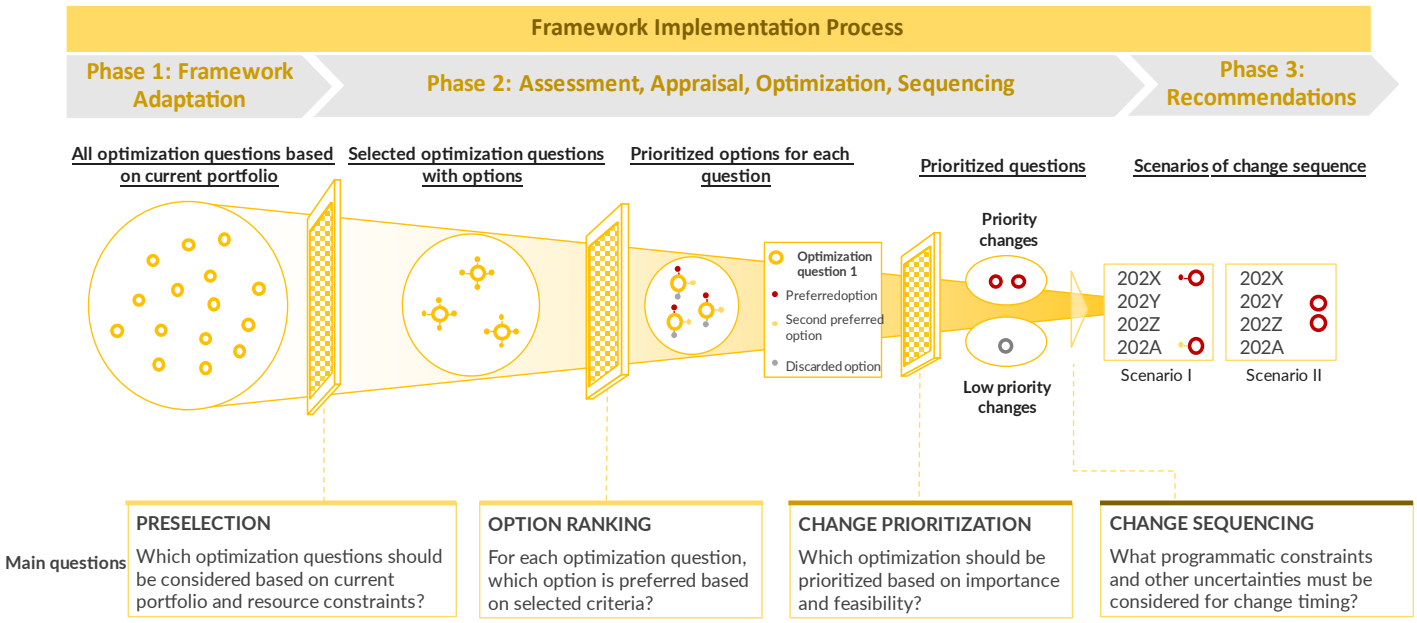
Optimization processes are best conducted through a structured, transparent and deliberative approach that combines available evidence with informed judgement. This tool adopts an evidence informed deliberative process, adapted to immunization policy and planning, with the primary objective of facilitating trade-offs (through multi-criteria decision analysis or MCDA) rather than producing purely technical rankings. Defining decision making criteria involves translating the health system's overarching goals - such as maximizing population health, protecting the poor, or promoting equity - into operational criteria that will later be used to assess and compare specific interventions.

This tool is grounded in a set of complementary technical and procedural principles to support fair, robust and implementable optimization decisions (see Appendix D): evidence-responsiveness, pragmatism, comprehensiveness, adaptability, country ownership and transparency.

The optimization process follows a progressive funnel approach, in which a broad set of potential optimization questions is gradually narrowed through structured assessment and deliberation.

1. Starting from the current vaccine portfolio and an initial long list of optimization questions, a subset of questions is selected based on country's priorities, resource constraints, relevance and feasibility during *Phase 1 (Framework Adaptation*)
2. *In Phase 2*, each selected optimization question is appraised against a predefined set of criteria, leading to the identification of preferred, secondary and discarded options. These appraisals support the prioritization of optimization questions and options, distinguishing high-priority from lower-priority optimizations
3. Finally, in *Phase 3*, preferred options are sequenced over time into coherent implementation scenarios, considering interactions, dependencies and system constraints, and translated into concrete recommendations. This stepwise process ensures that optimization decisions are evidence-based, transparent and aligned with national priorities and implementation realities.

Figure 1 Optimization funnel



Workshop-based process

Optimization is implemented through a sequence of steps that mirror the logic of the prioritization NVI-PST tool, shifting the focus from future vaccine introductions to optimization questions and options of the current vaccine portfolio in the country. These steps include defining scope and questions, agreeing on decision criteria and weighting, compiling and reviewing evidence, assessing and comparing options, and developing sequenced recommendations.

The process is typically organized around two facilitated stakeholder workshops, supported by intersessional analytical work:

- **Workshop 1: Framework adaptation**
    - Confirm scope and objectives
    - Select optimization questions

- Agree on decision criteria, definitions and relative importance (weighting)
- Define evidence needs and data collection responsibilities

- **Workshop 2: Assessment, appraisal optimization and sequencing**
  - Review and discuss synthesized evidence
  - Appraise and compare options against agreed criteria
  - Deliberate on feasibility and implementation implications as part of the appraisal
  - Develop sequencing scenarios and identify preferred options

Between workshops, a national technical team (usually the NITAG secretariat or the EPI team) is responsible for compiling and synthesizing evidence in line with the agreed framework, supported by NITAG members.

Regardless of configuration, optimization outputs should be explicitly linked to implementation planning. Recommendations should describe not only preferred options, but also timing, and prerequisites to facilitate integration into national strategies, budgets and partner processes.

Figure 2 Optimization process steps

Phase	Step	What	Related activity
Phase 1	1	**Review portfolio and potential optimization questions** (preselect up to 10 questions)	**Before and during online session**
	2	**Select up to 3 optimization questions to address** (voting through an online questionnaire can help) and clearly define **options**	
Phase 1	3	For each question: **Review and select up 10 out of 55 proposed and assign weight to criteria**	**Workshop 1**
	4	For each criterion: **Define measurable indicators**	
Phase 2	5	For each criterion: **Collect indicator data and prepare content to allow for easy comparison of options**	**Data collection**
	6	For each question: **Rank options on all criteria**	
	7	For each question: Based on average ranking and discussions, **chose preferred/parked/discarded options**	
Phase 2	8	Compare optimization questions, discussing importance and feasibility and **defining priority level (high/low) for each question**	**Workshop 2**
	9	**Define programmatic, budget and vaccine-specific constraints**	
	10	**Draft scenarios based on preferred options, priority level and constraints**	

Process configurations – considering optimization and prioritization

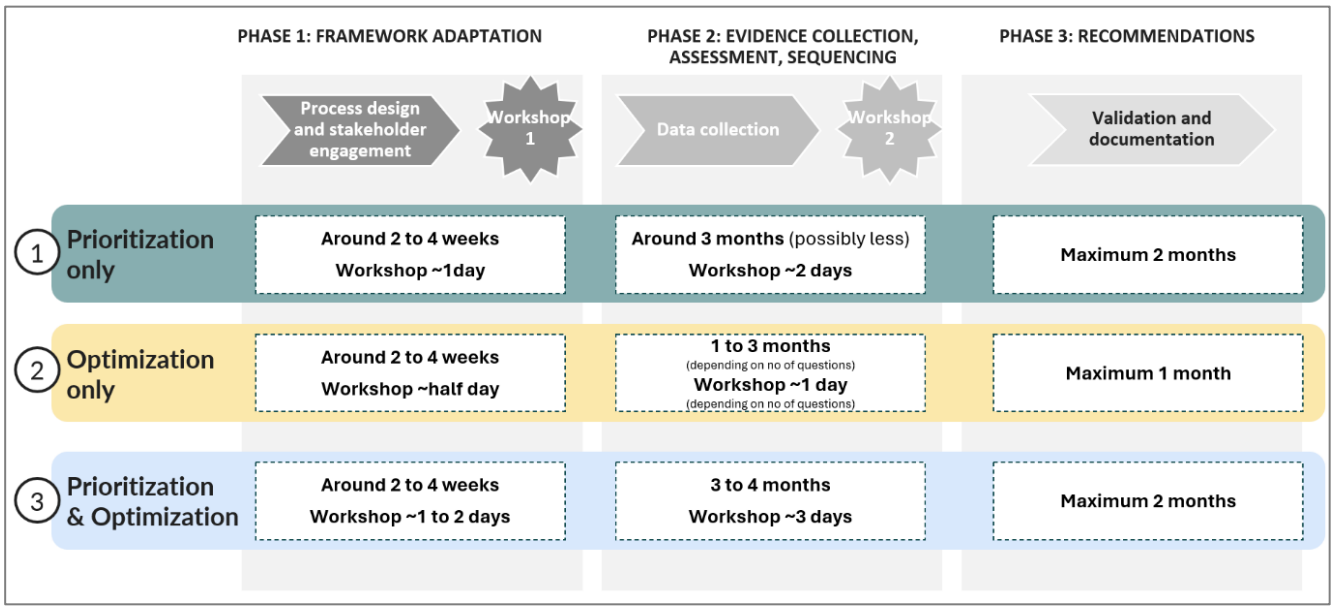
Depending on national objectives, the optimization process may be implemented in one of the following configurations:

- **Prioritization only**, focusing on selection and sequencing of future vaccine introductions. The process lasts approximately 4 to 6 months.
- **Optimization only**, focusing on vaccines already in the portfolio (e.g. product switches, schedule or delivery adjustments). The process lasts approximately 2 to 3 months.

- **Combined prioritization and optimization**, addressing both existing vaccines and future introductions within a single, integrated process. The process lasts approximately 6 months.

When prioritization and optimization are combined, explicit attention should be given to coherence between the two processes, particularly with regard to sequencing, feasibility and budget impact.

Figure 3 Process configurations



V. Phase 0: Process design and preparation

Purpose

Phase 0 establishes the foundations for a robust and efficient optimization process. Its purpose is to ensure clarity on mandate, scope, governance and timelines before technical work begins. Adequate preparation at this stage is critical to avoid scope creep, misalignment with decision-making cycles, or unrealistic expectations regarding outputs.

Key activities

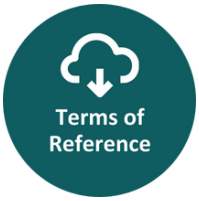
During this phase, national stakeholders agree on why the optimization exercise is being conducted, how it will be used, and who will be responsible for leading and contributing to the process. This includes confirming whether the exercise will focus exclusively on optimization of the existing portfolio or be conducted jointly with prioritization of future vaccine introductions (selection of one of three configurations presented in figure 3).

A rapid review of the current immunization portfolio is typically undertaken to identify major programmatic, financial or system-level pressures that motivate the exercise. This review is not intended to be exhaustive, but to provide a shared understanding of context and constraints.

To speed up this process, links can be drawn with the preparation of the NIS. For example, the “Situational Analysis” of the NIS can provide valuable inputs on current immunization challenges, constraints and portfolio review needs

Budget analysis of the vaccine portfolio consists of a critical element of the optimization and prioritization process, as the majority of the budget for immunization is for vaccines. If the country selects budget implications as one of the criteria, the cost of each vaccine product option needs to be analyzed. Best estimates of vaccine costs and availability for the country can be sourced through past tender documents, websites of pooling procurement services (e.g. UNICEF Supply Division and PAHO Revolving Fund) or websites comparing vaccine prices (WHO Market Information for Access). Several cost scenarios may be developed, dependent on the optimization questions and available product options. The total cost per optimization scenario needs to be compared to the budget available for vaccines combining domestic, international development aid and donor funding. Affordability analysis may need to be conducted to compare the future vaccine cost and the fiscal space for health sector and the Medium-Term Expenditure Framework (MTEF).

Roles and responsibilities



The process is usually jointly carried out by the EPI team and the NITAG, which provides technical oversight. A small core team or secretariat is identified to coordinate activities, prepare materials, consolidate evidence and document outcomes (**OPTI 0.1 Terms of Reference** can be used at this point). Other stakeholders, such as health financing units, disease control programs, civil society or local community representatives, and technical assistance partners, are engaged as appropriate, particularly where their input is critical to feasibility or sustainability assessments.

The Core Team should bring:

- NITAG Chair
- NITAG Secretariat
- EPI manager or deputy manager
- Any technical partner assisting with this process, including WHO and UNICEF

Outputs

By the end of Phase 0, countries should have:

- a clearly articulated purpose and scope for the optimization exercise (see **OPTI 0.1 Terms of Reference**)
- onboarded key stakeholders (see **OPTI 0.2 Stakeholders engagement slidedeck** to support this activity)
- an agreed process configuration (optimization only, prioritization only, or combined)
- defined roles and responsibilities for all key actors (**OPTI 0.1 Terms of Reference** can serve as a basis for roles and responsibilities description)
- a realistic workplan (see **OPTI 0.3 Workplan template**) and timeline aligned with national planning, budgeting or funding cycles

Specificities of the joint optimization and prioritization configuration

When prioritization and optimization are combined, Phase 0 should explicitly clarify how results from optimization (for example, potential efficiency gains or freed capacity) will inform prioritization and sequencing decisions.

VI. Phase 1: Framework adaptation

Purpose

Phase 1 establishes the analytical and deliberative foundations for the optimization process. The objective is to agree on the scope of the exercise and the decision framework that will be used in the option appraisal phase. This includes defining the optimization questions and options to be assessed, selecting and defining decision criteria for each optimization question, and agreeing on evidence needs and key assumptions. Decisions taken during this phase determine the relevance, credibility and feasibility of the entire process.

Focus on criteria for optimization appraisal

The optimization framework draws on a comprehensive list of decision criteria developed under the NVI-PST, comprising 72 criteria that span public health impact, equity, economic considerations, feasibility and system performance. For optimization exercises, a reduced list of 55 criteria[3] has been developed reflecting the most relevant criteria to consider as part of an optimization process. During phase 1, **countries will pick from this list a maximum of 10 criteria for each optimization question.**

In line with the WHO PRIORITI framework, criteria selection should be guided by four fundamental ethical principles: **efficiency, equity, social and economic impact, and feasibility**. These principles help ensure that optimization decisions balance health gains with fairness, broader societal considerations and real-world implement ability.

In practice, optimization places particular emphasis on feasibility-related criteria, including programmatic complexity, supply reliability, health workforce implications, cold chain requirements, cost implications and sustainability. These considerations are critical for distinguishing options that are theoretically desirable from those that can be realistically implemented within existing or near-term system constraints. While importance- or impact-related criteria may still be included, they generally play a less dominant role than in prioritization exercises.

Criteria should be explicitly aligned with the intended trade-offs of the optimization exercise. Selecting too many criteria, or criteria that do not reflect the key decision tensions, can dilute the analysis and obscure conclusions. Weighting can be applied to reflect the relative importance of various aspects in the trade-off, aligned with the objectives of set for each optimization question.

To support an efficient and focused deliberation, the **tool design team has prepared preliminary subsets of proposed criteria tailored to each optimization question** (see **OPTI 1.1 List of Optimization Questions**). These preselected criteria sets serve as a starting point for discussion during Workshop 1 and may be reviewed, augmented or reduced by participants to ensure alignment with national priorities, decision objectives and contextual considerations.

Online session

An initial online stakeholder engagement session is recommended to introduce the optimization process, present the proposed methodology, and gather structured inputs from a broader group

[3] This list can be found in 1.1 NVI-PST - Phase 1 - Prioritized list of criteria and indicators, using the "Optimization" column as a filter.

of stakeholders ahead of the first in-person (or virtual) workshop. This session serves to build shared understanding, promote transparency, and inform the selection of optimization questions and decision criteria in Phase 1.

The session is not intended to replace formal deliberation during Workshop 1, but rather to inform and streamline it by capturing early perspectives, identifying areas of convergence and divergence, and refining the scope of the exercise.

Participants

The online session typically includes a wider group of stakeholders than the core workshop, such as:

- EPI staff at national and subnational levels
- NITAG members and technical experts
- representatives from health financing, planning and procurement units (including from the health benefit package design team)
- relevant programme managers (e.g. maternal and child health, malaria control program)
- partners (WHO, UNICEF etc.) and development agencies, as appropriate

It is recommended that international experts (e.g. RITAG, WHO HQ, SAGE members) are invited to the online session during the review of optimization questions, to address any technical question the audience may have

Participation may be asynchronous or recorded to maximize inclusiveness and accommodate different schedules.

Preparation: focus on portfolio review

Prior to the online stakeholder engagement session, a structured review of the existing national immunization portfolio should be conducted by the core team to establish a shared baseline and inform subsequent discussions.

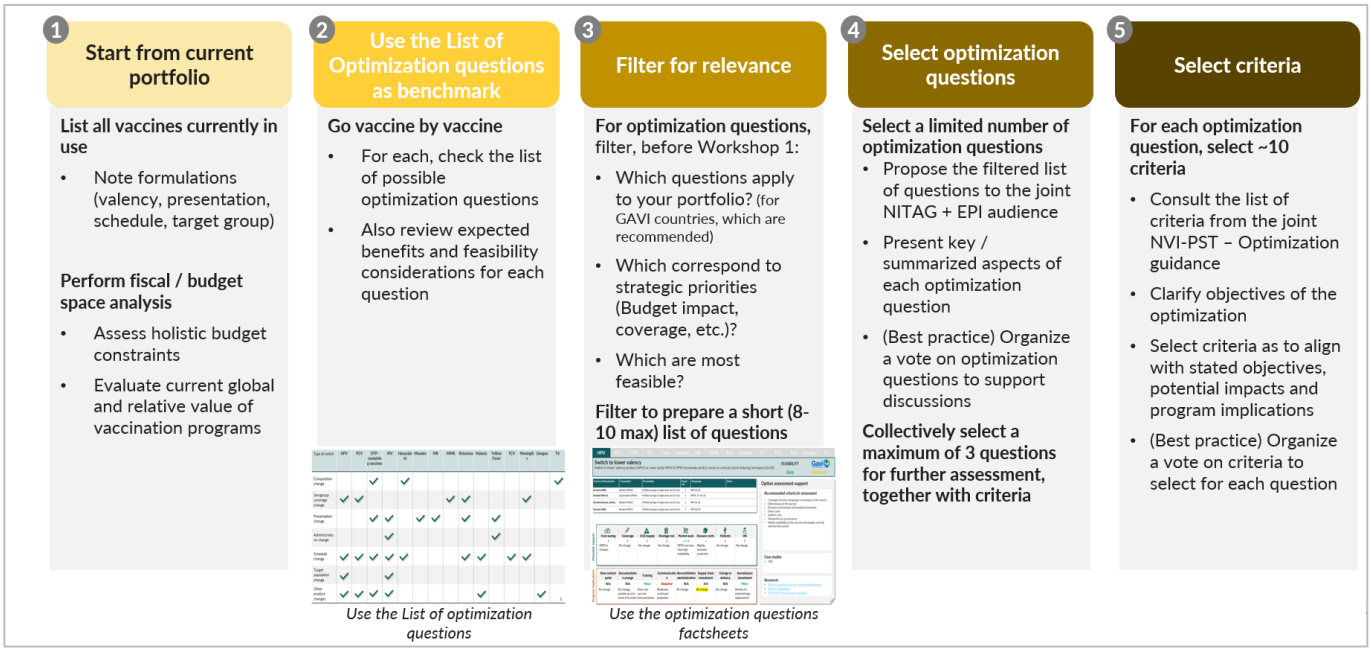
1. This review begins with a **concise mapping of all vaccines** currently in use, documenting key characteristics such as formulation, presentation, dosing schedule, target population, delivery platform and price. The portfolio review should also incorporate a preliminary assessment of the financial context, including a high-level overview of current immunization expenditure, anticipated budget envelopes and broader health sector constraints including domestic financing, IDA and donor funding. The objective at this stage is to develop a common understanding of affordability and fiscal pressure rather than to conduct detailed costing or economic analysis.

2. Using a standard **list of optimization questions and fact sheets provided by this tool** (see **OPTI 1.1 List of Optimization Questions**) as a reference, the portfolio is then reviewed vaccine by vaccine to identify which optimization questions are relevant and aligned with national strategic objectives and priorities, such as improving coverage, enhancing efficiency or managing financial allocation. Each potential question is briefly appraised in terms of expected impacts and perceived programmatic implications.

3. The core team should **filter** this long list of possible optimization questions to a **manageable shortlist**, typically not exceeding 8-10 questions.

4. Finally, the core team should **identify a questionnaire tool** (e.g. Google Form) that will be used to collect preferences from voting members on optimization questions **as well as define who will have voting rights** (e.g. core NITAG members only, all NITAG members, NITAG+EPI team, etc.)

Figure 4 Portfolio review and optimization question selection process



Content and facilitation

During the session, the core team presents an overview of the optimization exercise and its place within national planning and decision-making processes. This typically includes the objectives and scope of the optimization exercise, an explanation of the optimization concept and how it differs from, and relates to, prioritization, a high-level description of the MCDA-informed methodology, including the role of criteria and deliberation and an overview of the current immunization portfolio and the key challenges motivating optimization. An extensive presentation of the criteria available can be included if deemed appropriate.

Participants are then introduced to:

- a preliminary list of around 8-10 proposed optimization questions (*see the previous section*) together with basic information on those questions
- illustrative optimization options under consideration for each question, where relevant
- a preliminary set of decision criteria that may be used to assess each optimization option

Finally, participants are invited to complete a structured online form[4] to provide their inputs. The form is designed to capture preferences and perspectives in a systematic manner and may include:

- ranking or selecting priority optimization questions

[4] Although using an online tool is highly recommended, this step can also be carried out using traditional methods, such as paper forms or other analog techniques, to gather and discuss preferences

- identifying additional optimization questions not previously listed

Responses are collected and analyzed by the core team or secretariat. Results will be summarized in a neutral and transparent manner as part of Workshop 1 content.

Framework adaptation (Workshop 1)

Participants

Workshop 1 should include a balanced group of stakeholders with both technical expertise and decision-making relevance, typically comprising:

- *Facilitator: Core team*
- *Chair: NITAG Chair & EPI manager (co-chairs)*
- NITAG members or technical experts designated by the NITAG
- EPI programme managers and technical staff
- representatives of planning, budgeting and health financing units (including from the health benefit package design team)
- procurement, supply chain or logistics experts
- Other Program managers (e.g. MNCAH, malaria control program)
- partners providing technical support, as appropriate

The number of participants should be sufficient to ensure diversity of perspectives while remaining manageable for facilitated discussion.

Practical tip: *If not conducted in advance of the workshop as described above, participants should first be asked to respond to a questionnaire during this workshop to inform the key decision points, and this input can be incorporated into the slidedeck by a designated individual during initial agenda items.*

Preparation

Beyond the identification of stakeholders and management of logistics[5], planning for the Framework Adaptation Workshop includes:

1. **Preparation of standard material**, including a reminder on the methodology, an overview of the current immunization portfolio (including schedules, coverage trends, etc.), and the optimization process workplan

2. **Analysis and preparation of feedback from the questionnaire**, including the initial list of potential optimization questions (based on **OPTI 1.1 List of Optimization Questions**) with options, the results from the online questionnaire and proposed sets of decision criteria

3. **Preparation for evidence collection workplan:** Following decisions on the vaccine candidates and criteria to be considered for the prioritization and sequencing exercise, the core team will develop an evidence collection plan. An evidence collection planning toolkit is provided to support this process, including a guide to collecting evidence **(2.2 NVI-PST - Phase 2 - Guide to collecting evidence and building content),** evidence

[5] More details on this can be found in the NVI-PST READ ME guidance

collection planning matrix (**OPTI 1.2 Data collection matrix**) and sample indicators for essential and significant criteria (**VPOP 1.1 Criteria & indicators**). In advance of the workshop, the assigned core team member (Evidence Collection Lead) reviews the evidence collection planning toolkit and determines the process to use to conduct this evidence collection, leveraging pre-existing NITAG working groups as appropriate. Planning for evidence collection includes:

a. Determining how evidence collection assignments will be made, including whether assignments should be made by optimization questions or by group of criteria (e.g. burden of disease criteria), or using a mixed-methods approach. Additionally, some data points may be country-specific (e.g., perception of the target population of the disease risk) whereas others will be global (e.g., duration of protection); evidence that is not specific to the country may be collected by a global partner, if available.

b. Determining the timeline and process for members to share the evidence they've collected with the Evidence Collection Lead. This must be completed in advance of the second workshop, with sufficient time to enable the Evidence Collection Lead to process the data and format it for sharing.

A mixed-methods approach to organizing data collection and assigning leads is recommended, based on the specifics of the data to be collected. Though this method requires more detailed planning, it will be most time-efficient for the evidence collection and synthesis.

c. Developing a process for dealing with evidence that members are unable to find/access, such as asking other technical partners or experts to assist, or reviewing relevance/weighting of the criteria.

d. Determining how and when the collected evidence will be shared back with the NITAG - for example, whether the evidence will be shared in advance of the second workshop or simply reviewed and discussed live in the workshop.

Practical tip: These materials should be shared with participants ahead of the workshop.

Workshop agenda and facilitation

Workshop 1 is typically conducted over one to two days and follows a structured sequence of sessions, with clear decision points.

The workshop may be facilitated as follows:

1. **Opening and objectives (Workshop Chair)**
   - Confirm the objectives of the optimization exercise
   - Clarify how results will inform national strategies, budgets or funding applications
   - Review the agenda, expected outputs and roles of participants
   - Review the workplan

2. **Introduction to the optimization framework (Core Team)**
   - Present the optimization concept and MCDA-informed approach
   - Clarify the distinction and relationship between prioritization and optimization

- Present the overall 3-phase methodology
- Present the extensive list of the 55 optimization criteria (if not all participating members are aware of the full list)

3. **Overview of the current immunization portfolio (EPI)**
   - Present the current schedule, performance and constraints
   - Discuss to clarify challenges and shared priorities
   - Identify of key constraints motivating optimization (e.g. financing, cold chain, workload)

4. **Session 4: Selection of optimization questions (Core Team)**
   - Review of the preliminary shortlist (8-10) of optimization questions
   - Present the results of the online vote
   - Discuss relevance, strategic importance and feasibility for each question
   - Consolidate a final list of up to 3 optimization questions, together with considered options for each optimization question (e.g. PCV schedule optimization question with 2+1 and 1+1 as possible options)

The group can also decide to tackle some questions at a later stage (for example focusing on urgent questions now but planning to tackle less urgent later the same year)

5. **Session 5: Selection and definition of decision criteria (Core Team)**

<u>For each selected optimization question:</u>

   - Review the list of proposed criteria in the optimization question fact sheet and collectively[6] select up to 10 criteria. Criteria from the proposed list can be kept or removed and other criteria from the extensive list (see **VPOP 1.1 Criteria & indicators**) can be added
   - Discussion on the relative importance of criteria, including whether and how weighting will be applied and the weighting scheme

Weighting should reflect the specific objective of the optimization question. Compared with prioritization, optimization places greater emphasis on feasibility and implementation considerations, while importance-related criteria typically carry less weight.

6. **Session 6: Time horizon and sequencing assumptions**
   - Agree on the time horizon for the optimization exercise (such as alignment with NIS).

7. **Session 7: Evidence collection plan**
   - Review the proposed evidence collection plan and assign responsibilities for evidence collection and synthesis, including confirmation of the Evidence Collection Lead.

[6] In contrast to the NVI-PST approach, criteria are not included in the online questionnaire. Their selection is instead solely conducted during facilitated discussions, drawing on the pre-defined list of proposed criteria and informed by the objectives of the optimization exercise.

- Agree on timelines, submission processes and deliverables to ensure evidence is available and synthesized in advance of Workshop 2.

For each optimization question:

- Break down in groups to clarify the indicators required for each selected criterion and identify potential sources

8. **Session 8: Preparation for evidence collection**
   - Break down in groups to define the indicators required for each selected criterion and identify potential sources, using the **OPTI 1.2 Data collection matrix** document. This can be done either by optimization question or across all selected questions in each working group. Examples of indicators can be found in the **VPOP 1.1 Criteria & indicators** document.
   - Then regroup in plenary and have each working group present their selected indicators to ensure consistency and shared information

Outputs

By the end of Phase 1, countries should have:

- a final, agreed list of optimization questions within scope and the options associated with each question
- clearly defined decision criteria and, where relevant, their relative weight
- an agreed plan for evidence collection and synthesis

Specificities of the joint optimization and prioritization configuration

When Workshop 1 addresses both prioritization and optimization, facilitators should ensure that:

- the distinction between vaccines (prioritization) and optimization questions is clearly maintained
- criteria can be harmonized where possible to reduce analytical burden; in case working groups are structured by criteria group, each should be responsible for collecting data for both optimization and prioritization
- the combined scope remains manageable
- explicit linkages between optimization outcomes and prioritization or sequencing decisions are anticipated and documented

In case of joint optimization and prioritization, to ensure meaningful discussion and feasible analysis, the number of optimization questions, vaccines for prioritization, and decision criteria should be kept to a manageable level. For example, select a maximum of 4 vaccines to compare and 10 criteria for prioritization and 1-2 optimization questions with max. 8 criteria

VII. Phase 2: Assessment, appraisal optimization and sequencing

Purpose

Phase 2 is the analytical and deliberative core of the optimization process. Its purpose is to assess the defined optimization options against the agreed decision criteria, deliberate on trade-offs and feasibility, and develop coherent sequencing scenarios. This phase translates the framework established in Phase 1 into concrete preferences and pathways for action.

Evidence collection and synthesis

Robust and transparent evidence collection is essential to support sound, evidence-informed optimization decisions. Evidence collection and synthesis provide the analytical foundation for assessing optimization options and for structured deliberation during the optimization and sequencing process. The approach outlined here is aligned with the prioritization tool NVI-PST and WHO guidance on evidence-informed immunization decision-making, and should be adapted to the scope, timelines and capacities of each country.

Following agreement on decision criteria and indicators, an evidence collection plan is developed, typically using the evidence collection planning matrix. Individuals or institutions are then assigned responsibility for collecting and summarizing evidence for specific indicators and optimization questions. Evidence collection generally involves three interrelated steps: identification of relevant evidence, assessment of evidence quality, and preparation of a concise evidence synthesis for review and deliberation.

An Evidence Collection Lead is designated to coordinate and oversee this process. The Evidence Collection Lead is responsible for ensuring that assigned contributors complete their tasks within agreed timelines, providing technical support as needed, and consolidating inputs into a coherent synthesis. Where evidence is limited or unavailable for specific indicators, the Evidence Collection Lead, in consultation with the NITAG Chair or equivalent authority, determines the appropriate path forward. This may include commissioning targeted analyses or reviews where feasible, or explicitly documenting evidence gaps for consideration in decision-making and future evidence generation.

Identification of relevant evidence

Evidence should be collected for all agreed indicators, drawing on the most relevant and credible sources available. Depending on the optimization question, this may include:

- published and unpublished scientific literature
- national statistical data, surveillance systems or programme records,
- WHO guidance, position papers and SAGE recommendations
- recommendations and assessments from other NITAGs or Regional Immunization Technical Advisory Groups

Global resources such as the Global NITAG Network Resource Center (especially the Vaccine Compendium) and the SYSVAC registry can be used to identify existing recommendations and systematic reviews. All identified evidence should be documented using a standardized template Capturing key attributes such as study type, context, population, outcomes and date, can facilitate transparent review and comparison but is not mandatory.

Key assumptions, uncertainties, and evidence gaps should be clearly documented to inform final decisions and any additional recommendations.

Assessment of evidence quality

As evidence is collected, its quality and reliability should be assessed in a structured but proportionate manner. This assessment is intended to inform prioritization and optimization deliberations and does not replace the full evidence appraisal conducted by NITAGs when formulating formal recommendations (especially through the Evidence-to-Recommendation framework).

Key aspects to consider include:

- potential bias or methodological limitations
- disclosure and implications of possible conflicts of interest
- completeness and consistency of data
- relevance and transferability to the national context

WHO guidance on evidence assessment, including approaches such as GRADE, may be used as a reference where appropriate. The assessment of evidence quality and limitations should be documented alongside the evidence itself when relevant.

Preparation of an evidence synthesis

Once evidence has been collected and assessed, the Evidence Collection Lead reviews submissions, validates quality assessments, and resolves any discrepancies through discussion with contributors. Validated summaries are then consolidated into an evidence synthesis, structured to allow comparison across optimization options and criteria and to highlight key findings, uncertainties and evidence gaps.

Where significant gaps remain (particularly for options involving products still under development or not yet licensed) these should be explicitly noted, along with any available information on anticipated timelines for data availability. The final evidence synthesis should be shared with workshop participants sufficiently in advance of the optimization and sequencing workshop to support informed deliberation, while recognizing that detailed discussion and interpretation will occur during the workshop itself.

Workshop 2

Participants

Workshop 2 typically involves the same core group as Workshop 1 to ensure continuity and institutional memory. Additional experts may be invited to contribute specific inputs, such as costing, supply chain, market or financing expertise, depending on the optimization questions under consideration.

Facilitation is done by the Core team under the joint leadership of the NITAG Chair and the director of the immunization program.

Preparation

Beyond the identification/invitation of relevant stakeholders and the management of logistics, planning for the Prioritization and Sequencing Workshop includes:

1. **Selection and preparation of workshop tools[7]:** The VPOP Optimization methodology is based on ranking the selected options for each criterion, weighting these results based on the criteria weighting scheme, and producing a combined weighted average option ranking. This requires use of a tool that allows members to rank the vaccines against each criterion. The core team member responsible for the management of feedback and tools should identify an online or analog tool to be used and prepare a separate poll question for each criterion, listing the options for the individuals to rank.
2. **Preparation of slides and material,** including:
    a. Preparing a reminder of the optimization process and methodology
    b. Preparing slides on the option ranking process to include voting tools and any other procedural elements,
    c. Preparing slides to clearly present the evidence synthesis, enabling a comparison across options for each criterion, as well as preliminary scoring or qualitative assessments, where appropriate
    d. Drafting template slides to present ranking results and inform decision-making (these slides will be filled out in the workshop as votes are received),
    e. Ensuring the EPI team prepares and lists any major programmatic, market and resource constraint that may affect feasibility or sequencing as well as present budget impact analysis
    f. Preparing slides on expected next steps, including the process for developing and finalizing the recommendations and any known dates for presenting the recommendations to national authorities.
3. **Definition of optimization question addressing order**. Though this is context-specific, the generally suggested order is the following:
    a. First address **target group** questions to ensure that health impact comes first
    b. Then address **serogroup** questions to ensure selected vaccines correctly tackle the health problem
    c. Then address **schedule** questions to optimize uptake and disease control

There are numerous online tools that can be used for vaccine ranking: for example, https://polleverywhere.com is a free tool that can be set up for this purpose. Important criteria for selecting this tool include:

- the capacity to set up as many live polls as the NITAG selected criteria,
- the ability to activate and deactivate questions throughout the duration of the workshop,
- the ability to trace who submitted each vote, and
- output calculations of the average ranking per vaccine for each criterion or the ability to export results to a CSV file for manual calculations.

Links to the tool should be accessible throughout the presentation. Using QR codes can facilitate access to the tool.

[7] Although using an online tool is highly recommended, this step can also be carried out using traditional methods, for example using tables or worksheets to rank/rate vaccines and compute overall rankings/ratings

d. Then address **presentation and administration** questions to optimize delivery

e. Finally address **product and composition** questions, achieving programmatic and financial benefits under constraint

However, for certain vaccines, some of those decisions need to be tackled together:

- In some cases, product choices affect schedule (e.g. rotavirus vaccines), therefore the two questions should be addressed at the same time
- In some cases, change in schedule and in product at the same time are limited (e.g. PCV 1+1 schedule & switch to lower valency not recommended by SAGE)
- Similarly, product choices and prices are often strongly linked to serogroup coverage, in some cases they should therefore be treated together
- Schedule revision can bring financial benefits or additional costs, meaning deciding on the product **to ensure balanced cost impact can be relevant**

All materials should be prepared in a clear and concise format and shared with participants in advance of the workshop.

Workshop structure and facilitation

Workshop 2 is usually conducted over two to three days and follows a structured sequence of sessions, with increasing focus on integration and sequencing.

The workshop may be facilitated as follows:

1. Introductions and Objectives (Workshop Chair)

- Provide a review of the purpose of the optimization exercise, including how it aligns with the country's NIS process, if relevant.
- Make introductions of attendees as needed.
- Provide any required information on logistics for the workshop.

2. Recap of scope, criteria and process (Workshop Chair)

- Remind everyone of the time horizon, optimization questions, options and decision criteria
- Review agreed assumptions and constraints
- Reiterate decision rules, voting process and documentation requirements

Using an example poll may be helpful for participants to practice using the online tool for ranking. This could be relevant to the workshop topic or a fun icebreaker question.

3. Review of evidence and option ranking, by criterion (Core Team)

For each optimization question, evidence is reviewed criterion by criterion. For each criterion:

- Presentation of synthesized evidence for each option.
- Clarification of uncertainties, limitations and data gaps.
- Opportunity for participants to request additional clarification or add any complementary evidence
- Scoring or ranking of options on the selected criterion using the agreed approach.

4. Appraisal and comparison of options by optimization question (Core Team)

Once all criteria have been reviewed for one optimization question:

- Aggregation of results, where applicable, while emphasizing interpretation rather than mechanical ranking.
- Structured discussion of results, including divergences across criteria and identification of key trade-offs
- Systematic appraisal of options using aggregated results
- Adjustment of preliminary results through deliberation where justified, with rationale documented

Capturing details on these discussions and justification for vaccine prioritization is critical for documenting clear and comprehensive recommendations for review by national authorities.

- Identified of preliminary preferred option(s) – in case the preferred option is different from the currently active option in the portfolio, the option is described as ***an optimization change*****.** There can be several preferred options as long as they are ranked ("first preferred option", "second preferred option", etc.).
- It is possible an option requires further investigation and evidence to be appraised against the others, in that case, this option can be **parked** for later review until evidence is made available
- Other non preferred options are ***discarded***

Once appraisal has been conducted for one optimization question, the next optimization question is discussed.

5. Prioritization of optimization questions (EPI & Core Team)

- Separate, explicit discussion of operational constraints led by the EPI team
- Assessment of requirements related to budget, workforce, training, cold chain, supply security and regulation.
- Qualitative classification of optimization changes according to importance (high importance, medium importance, low importance) and feasibility (e.g. immediately feasible, feasible with prerequisites, not currently feasible) through a structured discussion
- Selection of priority and non-priority decisions based on importance and feasibility
- Facilitators should ensure that feasibility considerations are treated as integral to decision-making and that disagreements are documented transparently.

6. Validation of preferred options and additional recommendations (Core Team)

- Agreement on final preferred option(s) for each optimization question.
- Identification of prerequisites, risks and mitigation measures.
- Confirmation of inputs to the recommendations phase.

7. **Sequencing and scenario development (Core Team)**
   - Combination of preferred options into realistic sequencing scenarios
   - Assessment of interactions between optimization options and across vaccines
   - High-level budget impact and sustainability checks for each scenario

In case several preferred options have been defined for certain optimization questions, scenarios can include different changes. For example, scenario A can prioritize "Question 1 – Option A" and scenario B can prioritize "Question 1 – Option B"

8. **Plan for Recommendation Development, next steps and conclusion (Workshop Chair)**
   - Review the process for recommendation development, with individuals clearly designated to write the recommendations.
   - If relevant, discuss timeline potential reassessment of sequencing scenarios and preferred options
   - Gather feedback on the overall exercise and address any general comments or questions.

Outputs

By the end of Phase 2, countries should have:

- Assessed and compared all optimization options against agreed criteria, with relevant evidence
- A set of **ranked** options for each optimization question, with **preferred**, **parked** and **discarded** options
- A clear understanding of feasibility constraints and prerequisites
- One or more **sequencing scenarios** reflecting programmatic and financial realities, together with high-level budget impact and resource utilization analysis for each scenario

Specificities of the joint optimization and prioritization configuration

When Phase 2 includes both prioritization and optimization:

- Optimization outcomes should be reviewed first to identify potential efficiency or capacity gains
- Prioritization of new vaccines should explicitly reflect updated feasibility and budget envelope
- Sequencing scenarios should integrate both optimization changes and new introductions in a coherent manner.

VIII. Phase 3: Recommendations and validation

Purpose

Phase 3 translates technical findings into endorsed, actionable policy recommendations. Its objective is to ensure that optimization results are formally reviewed, validated and integrated into national decision-making and planning processes.

Key activities

During this phase, the core team consolidates outputs from Phase 2 into a clear and concise recommendations package. This typically includes:

- a summary of the process, scope and decision framework
- a description of preferred option(s) for each optimization question and their rationale (with a reference to the evidence used)
- sequencing scenario with their high-level budget/resource impact analysis
- identified prerequisites, risks and mitigation measures

Draft recommendations are presented to relevant decision-making bodies for endorsement or approval, such as the NITAG, EPI leadership, ICC or senior Ministry of Health officials, depending on national arrangements. Feedback is incorporated and formal endorsement is sought through established processes.

Integration into planning

Once endorsed, recommendations should be systematically integrated into:

- the National Immunization Strategy (NIS) and related operational plans
- medium-term budgeting and financing frameworks
- procurement and supply planning
- partner engagement and funding applications, as relevant

Outputs

The main outputs of Phase 3 are:

- a formally endorsed set of optimization recommendations
- updated strategic and operational planning documents
- a high-level roadmap for implementation and review.

IX. Specificities for Gavi-supported countries

For Gavi eligible countries, optimization processes are important in ensuring coherence between national priorities, external financing and long-term sustainability. In these settings, optimization should be explicitly aligned with Gavi application process, approval and review cycles.

Key considerations include:

- assessing the implications of co-financing requirements and future funding trajectories
- ensuring that sequencing scenarios remain feasible within available support
- identifying opportunities to bundle optimization changes and new introductions within grant periods
- using optimization outputs to inform realistic requests and commitments.

For further information, countries are encouraged to contact their Gavi focal point.

Appendix A: Bibliography

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Appendix B: Acknowledgments

The following experts contributed to the framework design and helped build a comprehensive criteria list:

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Appendix C: WHO PRIORITI framework

The VPOP Toolkit (New Vaccine Introduction Prioritization and sequencing tool (NVI-PST) and Optimization module) can draw on WHO's PRIORITI framework, which is an eight-step approach for structured, transparent, inclusive and evidence informed priority setting in health (as highlighted in the figure below).

PRIORITI builds on existing priority setting frameworks and will be published in the forthcoming PRIORITI: (interim) guidance on evidence informed priority setting for health service packages, programmes and plans. A version of the framework was applied to global evidence informed priority setting and operational guidance for HIV[8], viral hepatitis and sexually transmitted infections as well as for priority setting in Tuberculosis programming[9]. Although different countries may apply these components to varying degrees and in different sequences, together they represent a comprehensive and adaptive framework for evidence-informed, inclusive and results-oriented planning processes

The PRIORITI framework sets out eight steps for organising EIPS in a structured, transparent, and evidence-informed way. PRIORITI provides a common process that can be adapted to different country contexts and levels of depth. It provides an overview, aligned with more detailed guides that have been used widely. Its purpose is to guide users through the main steps from preparation to implementation and review, while recognizing that in practice the steps often overlap and may be revisited.

Figure 5 PRIORITI framework

[8] https://iris.who.int/server/api/core/bitstreams/c215245f-66b3-4cf8-9664-7489e8adbed5/content
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Appendix D: Key principles

This guidance is grounded in a set of complementary technical and procedural principles to support fair, robust and implementable optimization decisions:

- The optimization approach is **evidence-responsive**, relying on the best available data and measurable indicators to ensure consistency of decision-making over time, while allowing decisions to be revisited as evidence, assumptions or contextual conditions evolve. Evidence is assessed transparently, and limitations, uncertainties and gaps are explicitly documented.

- The process is designed to be **focused, pragmatic and time-bound**, using a limited number of clearly defined optimization questions and decision criteria that reflect country priorities and operational realities. This ensures that the exercise can be conducted within a short timeframe and translated into actionable recommendations.

- At the same time, the framework is **comprehensive and adaptable**, covering the full range of potential optimization questions across the immunization portfolio and being applicable across country contexts, from low- to high-income settings.

- The approach is **country-owned, participatory and consensus-based**, with National Immunization Technical Advisory Groups (NITAGs) and the National Programme of Immunization playing a central role. Decisions are formed through structured deliberation, inclusive stakeholder engagement and collective agreement, rather than individual judgement, ensuring meaningful participation of those responsible for and affected by implementation.

- Finally, the process emphasizes **transparency and accountability**. Decision-making processes, criteria, assumptions and rationales are clearly documented and communicated, responsibilities are defined, and recommendations are linked to concrete policy, budgeting and operational actions.