



# DPCP SNAPSHOT

## IMMUNIZATION TOOLS TO HELP THE DOSE PER CONTAINER DECISION

Ministries of Health (MOH) considering a change in the presentation of vaccine containers or introducing different presentations of the same vaccine for different delivery contexts will want to assess the effects of that change in advance. The Dose Per Container Partnership (DPCP) reviewed 10 frequently used immunization tools that include inputs or outputs related to dose per container (DPC), and user feedback, and assess the tools' ability to support analysis of the impact of a DPC decision on six essential components of the immunization system<sup>1</sup>. This analysis highlights opportunities for future developments or adaptations of tools to better include DPC for future developments or adaptation of tools. The main findings were:

1. Users reported that populating the tools required significant effort and generally required technical support.
2. No tool addressed DPC considerations comprehensively or the impacts of changing DPC across the immunization system; however, users also stressed the importance of not adding new tools.
3. Three of the tools assessed could be adapted to examine the effect of DPC changes on some system elements. However no individual tool could weigh these trade-offs across the whole immunization system.

### THE TAKEAWAY

Although decision-makers consider alternative vaccine presentations in the interest of increasing coverage and reducing wastage, current immunization tools do not allow predictions of how such changes would affect the immunization system. Adapting some tools could allow consideration of certain, but not all, system impacts from changing DPC.

### THE STUDY

Countries use a variety of tools to make informed decisions about managing their immunization programs. Tools are available to forecast the annual need for vaccines and estimate cold chain requirements, program costs, and assess the impact of adding a new vaccine. However, these and other tools do not assess the effects of changing DPC presentations, or offering several presentations of the same vaccine.

In 2017, the DPCP team conducted an assessment of immunization tools and their usefulness for predicting system effects of changing DPC in terms of 1) coverage, 2)

### DPCP: EXAMINING THE EFFECTS OF MULTI-DOSE VACCINE PRESENTATIONS

The widespread use of multi-dose vaccine containers in low- and middle-income countries' immunization programs is assumed to offer benefits and efficiencies for health systems, such as reducing the purchase price per vaccine dose and easing cold chain requirements.

Yet the broader impacts on immunization coverage, costs, health workers behavior, wastage, and safety are not well understood. It is also unclear what processes governments typically go through to determine their choices about DPC, and what information decision-makers have or use when determining DPC.

To add to the limited evidence base on this topic, DPCP is undertaking a series of activities to explore current decision-making on DPC options and better understand the relationship between DPC and immunization systems, including operational costs, timely coverage, safety, product costs/wastage, supply/cold chain effects, health worker behavior and policy/correct use.

<sup>1</sup> Coverage, wastage, safety, health care worker behavior, cost and supply chain/cold capacity

# Trade-offs in Multiple-Dose Presentation

The DPCP seeks to better understand how changes in DPC could affect other components of immunization programs:



**COVERAGE RATES**  
including timeliness



**WASTAGE RATES**



**SAFETY**



**COSTS PER DOSE**  
and child vaccinated



**SUPPLY CHAIN**



**HCW BEHAVIOR**  
including willingness to open  
a multidose vial no matter  
how many children present

“IF [MOH/EPI] WANTS TO REDUCE WASTAGE, THEY ARE NOT SURE WHICH PRESENTATION TO PICK. THERE IS NO REAL UNDERSTANDING OF THE TRADE-OFFS BETWEEN DIFFERENT VACCINE CONTAINER PRESENTATIONS AND HOW TO PRIORITIZE DIFFERENT TRADE-OFFS.

– FEEDBACK FROM DPCP  
IN-COUNTRY PARTNERS

## THE FINDINGS

**Use of Tools for Planning:** Typically, country-level technical decision-makers will use a few of these tools but not all 10. The tools require similar data (health facilities, target population, cold chain equipment, vaccine schedule, etc.) and can also use data from another of the inventoried tools (for example, the Sizing Tool uses data from the DVD-MT on the country's reported vaccine wastage rate). Feedback from country-level partners indicated a high level of effort required to populate the tools, and that even with the tools, MOH officials rely on partner support, most prominently WHO, to help guide decisions on vaccine procurement and program planning. All tools identified were stand-alone, Excel-based, some with built-in information (i.e., vaccine options and costs, available CCE, etc.). This requires an updated version of the tool annually which is seen as a disadvantage.

**Tools for DPC decisions:** No reviewed tool addresses DPC considerations, particularly from a systems perspective, or describes the trade-offs among components. For example, certain tools can help assess cold chain capacity requirements and related costs if a vial size changes; yet the tools fall short of providing insight into the impact of that change on the overall system on coverage or health worker behavior. Additionally, these tools were not designed to consider different presentations of the same vaccine within a single health system, which countries are beginning to consider.

**Tools, DCP changes, and system impacts:** Tools—or any potential updates to those tools—cannot analyze the effect of DPC decisions on all system components, or identify the trade-offs involved. Most of the tools address supply chain capacity, and some will address wastage rate and cost per dose<sup>2</sup>. The more nebulous components of HCW behavior and safety are particularly hard to capture through these quantifiable tools, as is predicting coverage rates. However, the tools can be used to analyze

safety, 3) cost per dose, 4) supply chain, 5) wastage, and 6) health care worker (HCW) behavior. Team members identified 10 regularly used, Excel-based immunization-related tools through relevant websites (WHO, UNICEF, TechNet), immunization experts, DPCP partners, and MOH officials (Table 1). The team solicited feedback from partners including in-country stakeholders who have used the tools on the following aspects of the tools:

- Inclusion of an input or output related to DPC presentation or how a presentation might affect an immunization supply chain or program
- Ease of use
- Data requirements
- Ability to assess at least one trade-off related to different DPC choices
- Potential for adaption to incorporate the impact of a DPC change on systems components.

<sup>2</sup> Wastage rate can be calculated with the Forecasting Tool, Sizing Tool, VVC, and DVD-MT. The Sizing Tool, VVC, VPAT, and CCETCO calculate cost per dose.

the impact of a DPC change on one component or another, and with proper guidance, can provide a stronger foundation on which to make this decision and support its implementation.

**Adapting existing tools:** Users emphasized a preference for not adding new tools to examine DPC decisions; if anything, they recommended updates or adaptations to current tools in use. The review identified three tools that could be adapted to more comprehensively include some aspects of DPC considerations: the EPI Logistics Forecasting Tool, the Vaccine Presentation Assessment Tool, and the CCE Total Cost of Ownership Tool (Figure 1). Adaptions could include different vial size options, incorporating multiple presentations to use in different settings, and cold chain considerations for these vial size changes. With updated DPC options, these tools could provide guidance for different presentations and the impact on different individual system components. However, they would still fall short of being able to weigh the trade-offs and impact of a DPC change across all components<sup>3</sup> and how they relate and influence each other.

“THE UNICEF FORECASTING TOOL HAS A LIST OF ALL VACCINES AND PRESENTATIONS THAT UNICEF/ SUPPLY DIVISION HAS ACCESS TO, BUT THE [MOH/EPI] DOESN'T KNOW WHAT TO DO WITH THAT INFORMATION. THEY DON'T KNOW HOW TO PRIORITIZE, WHAT OTHER COUNTRIES HAVE INTRODUCED, ETC.”

– FEEDBACK FROM DPCP  
IN-COUNTRY PARTNERS

**TABLE 1: TOOLS INVENTORIED FOR THE DPC DECISION**

Tools*	Description
1 Cold Chain Equipment Inventory And Gap Analysis tool (Inventory Tool)	Provides cold chain equipment (CCE) inventory and gap analysis for service delivery points, district and provincial stores.
2 Expanded Program on Immunization (EPI) Logistics Forecasting tool (Forecasting Tool)	Forecasts needs for vaccines, safe injection equipment, cold chain, and ambient storage capacities.
3 Immunization Supply Chain Sizing tool (Sizing Tool)	Estimates required cold chain (CC) capacity at each level while planning for expected significant EPI changes.
4 Vaccine Volume Calculator (VVC)	Estimates net storage volume required and wastage expected per fully immunized child; can test the effect of new vaccine introductions.
5 District Vaccination Data Management Tool (DVD-MT)	Facilitates data processing from district vaccination monthly reports to summarize vaccine coverage rates.
6 Comprehensive Multi-Year Plan (cMYP)	Estimates costs, resource requirements, and financing needs for EPI; analyzes corresponding financing gaps.
7 Vaccine Forecasting and Cold Chain Tool	Uses country forecast with manufacturing availability and timing to determine shipment schedules, timing, and required funding.
8 Cold Chain Weight & Volume Calculator (CC W&V)	Determines shipping volume for in-country deliveries and cold chain storage.
9 Vaccine Presentation Assessment Tool (VPAT)	Models logistical and financial impact of adding a new vaccine to an immunization schedule.
10 Cold Chain Equipment (CCE) Total Cost of Ownership Tool (TCO)	Evaluates CCE and operating costs to budget and plan for new CCE across models and technologies.

<sup>3</sup> Coverage, wastage, safety, health care worker behavior; cost and supply chain / cold capacity

**FIGURE I. EVALUATION OF TOOLS TO INFORM DPC DECISIONS**

	Ease of Use	Data Requirements	Ability to assess at least one trade-off related to different DPC choices	Potential for adaption to better assess system components related to DPC	
<b>Inventory Tool</b>	●	●	●	●	
<b>Forecasting Tool</b>	●	●	●	●	
<b>Sizing Tool</b>	●	●	●	●	
<b>VVC</b>	●	●	●	●	
<b>DVD-MT</b>	●	●	●	●	
<b>cMYP</b>	●	●	●	●	
<b>Vaccine &amp; Forecasting Cold Chain Tool</b>	●	●	●	●	
<b>CCW &amp; V</b>	●	●	●	●	
<b>VPAT</b>	●	●	●	●	
<b>TCO</b>	●	●	●	●	
<b>LEGEND</b>	●	Would require regular assistance	Data intensive	Not possible	No potential
	●	Some assistance required	Moderate inputs	Limited	Limited potential
	●	No assistance required	Minimal inputs	Possible	High potential

\* Access the tools on these websites (in chronological order as appears in Table I):

1. [http://www.who.int/immunization/programmes\\_systems/supply\\_chain/resources/tools/en/index4.html](http://www.who.int/immunization/programmes_systems/supply_chain/resources/tools/en/index4.html)
2. [http://www.who.int/immunization/programmes\\_systems/supply\\_chain/resources/tools/en/index2.html](http://www.who.int/immunization/programmes_systems/supply_chain/resources/tools/en/index2.html)
3. [http://www.who.int/immunization/programmes\\_systems/supply\\_chain/resources/tools/en/index5.html](http://www.who.int/immunization/programmes_systems/supply_chain/resources/tools/en/index5.html)
4. [http://www.who.int/immunization/programmes\\_systems/supply\\_chain/resources/tools/en/index5.html](http://www.who.int/immunization/programmes_systems/supply_chain/resources/tools/en/index5.html)
5. <https://www.technet-21.org/en/library/explore/immunization-information-systems-coverage-monitoring/279-dvdm-district-vaccination-data-management-tool>
6. [http://www.who.int/immunization/programmes\\_systems/financing/tools/cmyp/en/](http://www.who.int/immunization/programmes_systems/financing/tools/cmyp/en/)
7. [https://www.unicef.org/supply/index\\_55506.html](https://www.unicef.org/supply/index_55506.html)
8. [https://www.unicef.org/supply/index\\_51098.html](https://www.unicef.org/supply/index_51098.html)
9. <https://vaccineresources.org/details.php?i=841>
10. <https://www.path.org/publications/detail.php?i=2576>

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