



## DPCP SNAPSHOT

### MEASLES VACCINATION IN ZAMBIA: BALANCING COVERAGE & WASTAGE

#### ZAMBIA'S DPC CHANGE

Zambia's measles prevention initiative seeks to reach 95 percent of children each year through the routine immunization program. Currently Zambia recommends two doses of measles-containing vaccine (MCV), to be delivered through the routine program at 9 months and 18 months of age. Historically, MCV has been available in a 10-dose vial. This presents challenges to front-line health care workers (HCWs) who are attempting to reach every child in their community, since an opened vial must be discarded at the end of an immunization session or six hours after reconstitution, whichever occurs first. The Dose Per Container Partnership (DPCP) quantified the coverage and timeliness of measles vaccination and investigated the views and behaviors of HCWs regarding the 10-dose vial presentation in 14 districts in two regions. The data showed that:

1. 62 percent of children in the coverage survey had received their first measles vaccination, and only 29 percent received their second. Fewer than half received either of their doses on time.
2. HCWs reported frequently turning children away rather than waste vaccine from the 10-dose vial, despite MOH guidance to vaccinate every child regardless of the number present at the vaccination session.
3. HCWs reported that they would favor lower-dose vials to prevent children from being turned away.

#### THE TAKEAWAY

HCWs' fear of wasting vaccine may contribute to Zambia's inability to reach the 95 percent coverage target for the two MCV doses mandated in Zambia. HCWs need an approach for balancing the trade-offs between increasing timely coverage and minimizing wastage. Examining the impact of lower dose-per-container presentation may strengthen MCV delivery.

#### DPCP: EXAMINING THE EFFECTS OF MULTIDOSE 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, and safety are not well understood. It is also unclear what processes governments typically go through to determine their choices about dose per container (DPC), and what information decision-makers have or use when determining DPC.

To add to the limited evidence base on this topic, the Dose Per Container Partnership, or 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, and policy/correct use.

# 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)

## THE RESEARCH

The Government of Zambia currently recommends lyophilized measles-containing vaccine (MCV) at 9 months for the first vaccination (MCV1) and 18 months for the second MCV2.<sup>1</sup> MCV is provided in 10-dose vials. Coverage rates have fluctuated over the past two decades. Coverage<sup>2</sup> for MCV1 was estimated at 90 percent in 2015 and 47 percent for MCV2—far below the 95 percent coverage needed to reach the World Health Organization's regional goal of eliminating measles.

10 DPC to 5 DPC. Baseline data collected in March/April 2017 included a household coverage survey, administrative records review, and observations of immunization sessions. Researchers also interviewed key informants (28 district-level managers and 32 facility-level HCWs) to understand their views on the 10-dose presentation, challenges to routine immunization, and how they decided on opening a vial versus not opening a vial. This case study describes the baseline findings, focusing on HCWs' views and decisions on managing the 10-dose presentation.<sup>3</sup>

“ THEN SOME END UP MISSING THE VACCINES OR THEY WILL COME AT A MUCH LATER DATE. ”

– HCW KEY INFORMANT INTERVIEW EXPLAINS WHAT HAPPENS TO CHILDREN WHEN TURNED AWAY DUE TO NOT ENOUGH CHILDREN PRESENT TO OPEN A 10 DOSE VIAL

In May 2017 the DPCP research team began mixed-method implementation research in Central and Luapula provinces in Zambia to examine the effects of changing the presentation of MCV from

## THE FINDINGS

**Coverage:** The household vaccination coverage survey showed that MCV1 coverage for children with vaccination cards<sup>4</sup> aged 12–23 months was 62 percent, and MCV2 coverage among children aged 24–35 months was 29 percent among children with cards.

**Timeliness:** Just under half (49%) of children with cards aged 12–23 months received their first MCV dose on time (from three days early to four weeks after they turned nine months). Thirty-nine percent of children with cards aged 24–35 months received the second dose on time (from three days early to four weeks after they turned 18 months).

**Challenges to achieving coverage:** Findings from the coverage survey and HCW interviews revealed many challenges that affected both vaccination coverage and timeliness. Though many of these were related to infrastructure (distance to facilities, seasonal migration, transport and fuel, facility functionality, and vaccine stockouts), HCWs' behavior also raised barriers. In the

1 In May-June 2017, the Government of Zambia switched to using a measles-rubella (MR) vaccine, and the DPCP intervention is using the MR vaccine to compare 5- and 10-dose presentations. However, this case study will use MCV to compare data before and after the switch from monovalent measles to MR.

2 World Health Organization (WHO) and United Nations Children's Fund (UNICEF). 2017. "Zambia: WHO and UNICEF Estimates of Immunization Coverage: 2015 Revision," available at [https://data.unicef.org/wp-content/uploads/country\\_profiles/Zambia/immunization\\_country\\_profiles/immunization\\_zmb.pdf](https://data.unicef.org/wp-content/uploads/country_profiles/Zambia/immunization_country_profiles/immunization_zmb.pdf)

3 The endline findings, showing the effects of the switch to a 5-DPC presentation, will be available late 2018.

4 Vaccination cards (or home-based records) are paper tools issued by HCWs and kept by the caregiver to track the vaccination status of a child; findings from this activity are based on analysis of cards or other home-based records. Cards were available for 72 percent of children aged 12–23 months and 63 percent of those aged 24–25 months.



**29 OF 32 HCWS SAID THAT CONCERNS ABOUT WASTAGE** influenced their decision to open a vial. **HALF OF HCWS** said that they had turned children away during outreach if there were not enough (usually at least five) to justify opening a vial.

Most respondents said that they had **NO SYSTEM FOR TRACKING THESE CHILDREN WHOM THEY TURNED AWAY** to see if they returned.

household survey, nearly one-fourth of caregivers said that they went to a facility for a vaccination but their child did not receive the service, mainly because they were told that **no vaccine was available (70%), not enough children were present to open a vial (27%), or no vaccinator was available (16%).**

**HCWs’ knowledge of vaccination policies:** Zambian national guidance specifies vaccinating all children regardless of the number present. Yet only 3 of 32 HCWs interviewed were able to describe the national directive; the other respondents were unaware of it.

**Decisions on vaccinating:** Key informants pointed out that facility performance is based on coverage, not wastage; but concerns about wastage clearly dominate decision-making. Both district supervisors and HCWs stressed the importance of limiting wastage, and 29 of 32 HCWs said that concerns about wastage influenced their decision to open a vial. Half of HCWs said that they had turned children away during outreach if there were not enough (usually at least five) to justify opening a vial. Most respondents said that they had no system for tracking these children whom they turned away to see if they returned. “Then some end up missing the vaccines or they will come at a much later date,” one interviewee said.

**Dose preference:** In interviews, most of the 32 HCWs said that they preferred lower-dose containers for the measles

“ **EVERYONE IS CONCERNED ON REDUCING THE VACCINE WASTAGE. IT IS A REASON WHY MOTHERS ARE SENT BACK AND ASKED TO COME A DIFFERENT DAY WHEN THERE ARE ENOUGH CHILDREN TO OPEN THE VIAL.** ”

– HCW KEY INFORMANT INTERVIEW

vaccine: 9 preferred 2 DPC, 9 specified 5 DPC, and 7 mentioned single-dose. They believed that lower-dose presentations would prevent people being turned away—thus increasing coverage—and would also decrease wastage. Though they acknowledged that preparing vials with fewer doses would take extra time, they did not see this as a problem.

This document was developed by JSI through the Dose Per Container Partnership (DPCP). The partnership is coordinated by JSI Research & Training Institute, Inc. in collaboration with colleagues from the Clinton Health Access Initiative, the HERMES modeling team and the International Vaccine Access Center (IVAC) through Johns Hopkins School of Public Health, and PATH. This material is intended to provide stakeholders evidence to guide informed, sustainable decisions on DPC when considering vaccine products and program design and may be used freely by all partners.