RESEARCH AND RESOURCES

OVERVIEW

Please find below an overview of key research and resources related to MR 5-dose. This is a compilation of formal and informal documents, many of which were shared with us during our interviews with key stakeholders. Please do not hesitate to reach out if there are additional resources that should be included in this repository.

You can find all the documents referenced below here on a public SharePoint folder. The folder is organized according to the headers below.

MR 5-DOSE RESEARCH

The effects of switching from 10 to 5-dose vials of MR vaccine on vaccination coverage and wastage: A mixed-method study in Zambia

John Snow Inc., Zambia MOH (2020)

- Switching from 10-dose to 5-dose MR vials increased routine vaccination coverage rate (5 percentage-point intervention effect was detected for MCV1 and 3.5 percentage-point effect for MCV2).
- Switching also reduced wastage by 47% (16.2% wastage rate in facilities using 5-dose vials compared to 30.5% with 10-dose vials).

Implementing 5-dose Measles-Rubella Vaccine Vials in Zambia–Research Findings

DPCP (2019)

- In-depth overview of the implementation research conducted in Zambia (mentioned above).
- The household coverage survey found a statistically significant increase in coverage for both doses. Wastage also decreased statistically significantly in health facilities where 5-dose MR vials were used.
- When using 5-dose vials, healthcare workers frequently reported that they believe they can reach more children.
- An analysis of cold chain equipment in intervention health facilities showed that there was sufficient space to accommodate the small increase in volume that occurred when switching from 10-dose to 5-dose MR vaccine vials.
- The incremental annual costs for switching to 5-dose vials (excluding the value of vaccines) was $0.11.

Coverage, Cost, and Safety Impacts of Primary Container Choice

IVAC (2013)

- Researchers estimated the percent coverage by session size range if a healthcare worker opens a vial only for sessions where 50% of doses will be used (i.e., only when at least five eligible children are present). With large session sizes, the coverage differences are small. But in areas where sessions are between 1-10 children—as in many "last-mile" settings—a 50% "opening threshold" will decrease coverage to 60% even when the needed vaccines are technically available.
- Similarly, in a hypothetical scenario, researchers found that cost per dose administered is higher for a multi-dose vial when sessions are small, and that relationship quickly reverses as session sizes increase.
- Regarding safety, researchers noted that increasing the doses per container increases the opportunity for user error, which may raise the likelihood of non-sterile injections and injections with expired vaccine.

Doses per vaccine vial container: An understated and underestimated driver of performance that needs more evidence

JSI, BMGF (2017)

- A review of published literature that explored the relationship between doses per container and immunization systems.
- The relationships examined in this study are organized within a systems framework consisting of operational costs, timely coverage, safety, product costs/wastage, and policy/correct use.

Health Care Worker Preferences and Perspectives on Doses per Container for 2 Lyophilized Vaccines in Senegal, Vietnam, and Zambia

Kanagat et al. (2020)

- Healthcare workers (HCWs) in all three countries preferred containers with fewer doses for reconstituted vaccines such as BCG and measles-containing vaccine.
- HCWs believed that containers with fewer doses of these vaccines could reduce wastage and missed vaccination opportunities.
- HCWs were more willing to open a vial for every eligible child when using containers with fewer doses.

The value of tailoring vial sizes to populations and locations

Wedlock et al. (2018)

- In Zambia, tailoring 5-dose MR vials to rural health facilities or by average session size results in the highest total vaccine availability compared to all other scenarios (regardless of open vial policy) by reducing open vial wastage without increasing cold chain utilization.

Modeling the economic impact of different vial-opening thresholds for measles-containing vaccines

Wedlock et al. (2019)

- Implementing any vial-opening threshold policy for measles-containing vaccine can have numerous system-wide effects. The vial opening threshold policy that maximizes vaccine availability and cost savings varies from country to country.
- According to the modeling, cold chain restraints played a major role in mediating the effects of different vial opening thresholds. When no cold chain constraints exist, the most beneficial policy is to open a vial for any number of children.
- In Benin and Mozambique, which had median session sizes of two to six, the 30% vial opening thresholds were the most beneficial. In Niger, where the median session size is nine, the 60% threshold performed well.
- In Benin, switching to 5-dose vials and using either no threshold or 30% threshold led to improvement in MCV availability of 10% compared to using 10-dose MCV with no threshold.

One size does not fit all: The impact of primary vaccine container size on vaccine distribution and delivery

Haidari et al. (2015)

- Results show that one size may not fit all when choosing a primary vaccine container. Rather, the choice depends on the characteristics of the vaccine, the vaccine supply chain, the immunization session size, and the goals of decision-makers. In fact, the optimal vial size may vary among locations within a country.

EVIDENCE OF MEASLES MISSED OPPORTUNITIES

UNICEF survey missed opportunities, 2012

UNICEF (2012)

- UNICEF surveyed 33 countries using 10-dose measles vaccine about their policies of vaccinating eligible children coming in on non-measles days.
- 42% of the countries reported that their policy was to ask the parent to return on the scheduled measles day.
- In 55% of countries, there is a policy of opening a 10-dose vial for any child. As such, the vaccine re-supply policy is not aligned with official MOH policy.
- 13 of the surveyed countries indicated interest in using 5-dose measles vials for their routine immunization programs.

Vaccine wastage in Nigeria: An assessment of wastage rates and related vaccinator knowledge, attitudes and practices

Wallace et al. (2017)

- On average, vaccinators reported that a minimum of six children must be present prior to opening a 10-dose MCV vial.
- 30% of caregivers had been turned away at least once for vaccination of their child; 53% of these children had not yet received the missed dose.
- Findings suggest that too much focus on reducing wastage leads to missed opportunities for vaccination.

Nigeria vaccine wastage assessment

Wallace (2012)

- Presentation on routine immunization vaccine wastage and HCW adherence to vaccine management practices and policies.
- Regarding the measles open vial policy, the study found (slide 13):
  - Only 2% of HCWs open a measles vial for every eligible infant
  - 98% open a measles vial only on certain days or for a certain number of children
  - On average, six infants must be present before a measles vial is opened

Assessment of vaccine wastage rates, missed opportunities, and related knowledge, attitudes and practices during introduction of a second dose of measles-containing vaccine into Cambodia's national immunization program

Wallace et al. (2018)

- Providers reported waiting for a mean of two children prior to opening an MCV vial, and 71% of providers reported offering MCV vaccination less frequently during scheduled vaccination sessions than other vaccines.
- When caregivers were turned away, 65% of caregivers reported that their children missed MCV vaccination.
- *(Note: additional resources, including the assessment's final report and a PowerPoint of preliminary findings can be found in the SharePoint folder)*

Studies of missed opportunities for immunization in developing and industrialized countries

Hutchins et al. (1993)

- Missed opportunities were mainly due to failure to administer simultaneously all vaccines for which a child was eligible; false contraindications; healthcare workers' practices, including not opening a multi-dose vaccine vial for a small number of people to avoid vaccine wastage; and logistical problems.

Assessment of missed opportunities for vaccination (MOV) in Burkina Faso using the World Health Organization's revised MOV strategy: Findings and strategic considerations to improve routine childhood immunization coverage

Kabore et al. (2020)

- In addition to poor integration of services and low awareness among healthcare workers, logistics (especially vaccine shortage and not providing vaccination services daily) were also found to contribute to missed opportunities.
- Current deep-rooted practices in many health facilities are aimed at minimizing vaccine wastage. This relates to healthcare workers' reluctance or refusal to open a multi-dose vial unless a critical mass of children is gathered, which is especially true for lyophilized vaccines such as BCG, MR and YF.

Qualitative insights into reasons for missed opportunities for vaccination in Kenyan health facilities

Li et al. (2020)

- Among healthcare workers, poor knowledge regarding appropriate administration, vaccination schedules, age restrictions, opening multi-dose vials, and valid contraindications can ultimately result in missed opportunities.
- Healthcare workers acknowledged that they both wanted and needed more health education and other on-the-job resources. Better education would help empower healthcare workers to do their jobs better, in addition to reinforcing standard operating procedures and policies such as whether or not to open multi-dose vials: ". . .[health workers] send mothers away because [they are] reluctant to open a vial of vaccine for one child."

Opportunities to improve vaccination coverage in a country with a fledgling health system: Findings from an assessment of missed opportunities for vaccination among health center attendees—Timor Leste 2016

Li et al. (2019)

- Healthcare workers reported knowledge gaps on national immunization policies and guidelines, especially regarding delayed vaccination and whether or not (and when) to open multi-dose vials.
- Healthcare workers were somewhat hesitant to open vials for only one child: ''Because only one baby, they could not provide the BCG vaccination to the baby."

Effects of the introduction of new vaccines in Guinea-Bissau on vaccine coverage, vaccine timeliness, and child survival: an observational study

Fisker et al. (2014)

- Researchers found a decrease in measles coverage by 12 months of age after the introduction of pentavalent vaccine.
- The reason probably lies in a concurrent decision to introduce stricter wastage policy and to focus on vaccination by 12 months of age. These policies resulted in vaccinators not opening any 10-dose vials for measles vaccine unless at least six children were present. Some children's vaccinations thus seem to have been delayed until they passed 12 months, after which they no longer became a priority age group.

Enhancing immunization during second year of life by reducing missed opportunities for vaccinations in 46 countries *Hanson et al. (2018)*	• The discussion notes that MOVs in preventive care settings could be due to healthcare worker reluctance in opening a multi-dose vaccine vial for fewer children for fear of vaccine wastage or shortages. • The findings demonstrated that an opportunity to vaccinate with measles vaccine was more frequently missed compared to DPT or oral polio vaccine. This is likely since measles vaccine is provided in 10-dose vials and must be used within a six-hour time period once reconstituted and may amplify concerns of vaccine wastage. It is important that healthcare worker training include the EPI policy of opening a multi-dose vial, even for one eligible child—which should be emphasized repeatedly.
Reasons why children miss vaccinations in Western Kenya; A step in a five-point plan to improve routine immunization *Agócs et al. (2021)*	• Through interviews with healthcare workers and caregivers, research identified that waiting to open a multi-dose vial in a low-attendance vaccination session occurred in 34% of health facilities and can contribute to missed vaccinations. • Waiting for more children to be present before opening a multi-dose vial also contributed to longer wait times, which caregivers listed as a primary complaint.
Household experience and costs of seeking measles vaccination in rural Guinea-Bissau *Byberg et al. (2016)*	• On average, mothers who had taken their child in for vaccination had to visit vaccination sites 1.4 times. Half of the mothers spent more than two hours seeking vaccination and 11% spent money on transportation. • Among children included in the control arm, at least 55% of missed opportunities could be directly related to restrictive measles vaccine vial opening policy (the mother reported being told to come back another day).
Summary of Existing Data on the Potential Impacts of Vaccine Doses per Container on Immunization Coverage *PATH (2013)*	• Literature review to assess the role that doses per vaccine container may have on immunization coverage. • Evidence suggests that missed opportunities occur due to local policies or practices that prioritize vaccine wastage avoidance over immunizing at every opportunity.

Missed opportunities for vaccination among children aged 0–23 months visiting health facilities in a southwest State of Nigeria, December 2019

Fatiregun et al. (2021)

- Findings demonstrated that opportunities to vaccinate with the measles vaccine were more frequently missed compared to the pentavalent or oral polio vaccine. This is consistent with other reports, and it likely due to the measles vaccine provided as a ten-dose vial, which must be used within six hours once reconstituted.
- This may amplify concerns among health workers about vaccine wastage. It is therefore important that health workers' training includes the EPI policy of opening a multi-dose vial, even for one eligible child. Additionally, having measles vaccine in smaller vials could also reduce MOV.

Vaccine innovation prioritisation strategy: Findings from three country-stakeholder consultations on vaccine product innovations

Mvundura et al. (2021)

- Missed opportunities for vaccination due to reluctance to open multidose vials was the barrier selected by the most respondents (126/268) for routine facility-based immunization.

The influence of linkages, feedback mechanisms, and caregiver mobility on immunization follow-up visits in Lideta sub-city of Addis Ababa, Ethiopia: a qualitative study

Zewde et al. (2021)

- Most vaccinators transfer caregivers without providing multi-dose vial (MDV) vaccines, mainly BCG and MCV, "to minimize wastage" and thus successfully reduce vaccine wastage rates; yet most caregivers wasted their time, energy, and money travelling from one health facility to another.

OUTBREAK INVESTIGATION

Summary report on the investigation of re-current measles outbreaks in SNNPR, Ethiopia March-April 2014

WHO (2014)

- Evidence gathered indicated that the possible reason for the re-current measles outbreak was mainly due to a failure to vaccinate:
  - MCV vaccine is only opened when the number of children is greater than six or seven, to minimize wastage rates
  - Some health facilities were providing vaccination to children before the age of 9 months, leading to an invalid dose
  - Health facilities were providing MCV immunization sessions monthly
- Another possible reason for outbreaks is that the potency of vaccine could have been compromised due to cold chain and vaccine management challenges.

Persistent Measles Outbreaks in Southern Nations, Nationalities and Peoples Region, Ethiopia: 22 March 2014

Ethiopia MOH (2014)

- This is an SNNPR presentation in 2014 which emphasized HCW hesitancy to vaccinate due to concerns of wastage leading to missed opportunity. Refer to slides 14-16 and 20.
- Slides mention hesitancy to open vials unless six, seven, or eight children are present and that vaccination sessions were only held once a month on different days of the month—both of which contribute to wastage. Suggests reviewing wastage policy and switching to 5-dose vials to boost coverage.

Persistent Measles Outbreaks in Southern Nations, Nationalities and Peoples Region, Ethiopia: 8 April 2014

Ethiopia MOH (2014)

- SNNPR presentation from 2014 which discusses gaps in health systems vaccination efforts which contribute to measles outbreaks. Refer to slides 25, 32, and 35.
- Includes recommendations to boost vaccination coverage:
  - Ensure measles vaccine vials are opened whenever an eligible child is present
  - Plan more frequent immunization sessions (at least 1 per week)
  - Boost communication of policy and procedures to all vaccinators for adherence

PARTNER RESOURCES

Measles and Measles-Rubella (MR) Vaccine Five-dose vial Presentations Facts Sheet 2021

UNICEF (2021)

- This is an overview of Measles and MR vaccines in both 5- and 10-dose vial presentations, including cold chain requirements, wastage rates, price per dose, visual differentiation, etc.

Gavi Alliance Market Shaping Strategy 2021-25 Annex D

Gavi (2021)

- Gavi market-shaping strategy states that the prequalification of a 5-dose vial has shown promise in reaching the “fifth child” via routine immunization, by potentially reducing healthcare worker hesitancy to open a 10-dose vial for single or very low patient volume vaccination sessions.
- Gavi notes that uptake has been austere due to a variety of factors, including lack of cost-benefit awareness, lack of wastage data, reluctance of countries to use two presentations, lack of separate accounting and stock management, data scarcity on missed opportunities for vaccination due to non-opening, and the standardization of a recommended 30% vial opening threshold for 10-dose vials.

Report of the Independent Review Committee to the Gavi alliance on the review of applications

Gavi (March 2021)

- The IRC analysis of measles applications (2018-2021) expressed strong concern for the apparent lack of investments in strengthening routine immunization programs.
- They noted that follow-up campaigns have become recurrent, "routine" costly exercises, not accompanied by meaningful efforts to improve measles coverage within the routine program—a priority need of all countries.
- While measles campaigns are an essential tool to reach elimination by supplementing routine vaccinations, they are also demanding exercises (in terms of human and financial resources) and should not simply replace inadequate routine immunization services.
- Applications should show a sound epidemiological justification based on robust data, a strong focus on reaching missed children and defaulters with appropriate strategies, and linkages to clear and tailored efforts to increase routine coverage.

WHO Weekly Epidemiological Record (November 2015)

WHO (2015)

- In high burden, low-coverage member states, low MCV1 coverage can be due to long-standing policies and practices that prevent vaccination of children 12 months of age or older, discourage opening a 10-dose vial when few children are present, and limit measles vaccination to only one session per month. (See page 630.)

Gavi guidance on measles 5-dose switch grant

Gavi (2020)

- Slides outlining the process for countries under Gavi support to apply to switch from 10-dose vials to 5-dose vials.

Purchase cost of MR vaccine by vaccination session size and vial size

UNICEF

- Slide comparing the cost of a 5-dose vial and 10-dose vial at various vaccination session sizes. A 5-dose vial is less costly at 1-5 children and 11-15 children session sizes.

Vaccine Forecasting: Measles and Measles-Rubella Vaccine Update

UNICEF (2019)

- Slides from the UNICEF Forecast Meeting in 2019 outlining countries who have requested supply of 5-dose vaccine. Also includes a slide showing the 10-dose and 5-dose vaccine next to each other for comparison.

REGIONAL- AND COUNTRY-LEVEL RECOMMENDATIONS AND PERSPECTIVES

National Strategy and Plan of Action for Measles and Rubella Elimination in Lao PDR, 2018–2022

Laos ministry of health (2018)

- Laos introduced 5-dose nationally in 2020 to mitigate missed opportunities of vaccination and reduce wastage. This is included in the national measles and rubella elimination strategy.
- Example communications materials to support the introduction can be found in the SharePoint folder.

Report of the Regional Immunization Technical Advisory Group meeting Congo-Brazzaville (November 2019)

AFRO RITAG (2019)

- Use of 10-dose measles vaccine vials may lead to vaccine wastage or discourage vaccine use for small groups. 5-dose vials have been developed as a more flexible alternative but are not yet being widely used.
- RITAG recommended that advocacy strategies be developed and implemented to raise awareness of the benefits of 5-dose vials and when their use should be considered, and that countries be encouraged to introduce when appropriate.

Report of the Regional Immunization Technical Advisory Group meeting (July 2020)

AFRO RITAG (2020)

- WHO/AFRO and UNICEF, with support from Gavi and other partner agencies, should provide timely technical orientation and advocate with Ministries of Health and NITAGs to incorporate the use of vials of multi-dose vaccines with fewer doses—specifically the use of 5-dose M/MR/MMR vials rather than 10-dose vials—as part of a broad Covid-19 recovery strategy to raise coverage, reduce wastage, and avoid HCW reluctance to open a 10-dose vial, especially where session sizes are small.

Analysis of Informal Survey of EPI National Managers: Perspectives on Doses per Vial and Immunization Programs from 15 Countries in Eastern and Southern Africa

JSI (2015)

- When interviewed, 11 out of 15 EPI managers from countries in Eastern and Southern Africa answered that they prefer 5-dose MCV; only one preferred 10-dose.
- Respondents indicated they believed a switch to 5-dose would be associated with reduced wastage, higher coverage, on-time coverage, decrease in drop-outs, and more flexible service provision.

Dose Per Vial Questionnaire Responses - IAIM, East & Southern Africa IST, West Africa IST Meetings, and TechNet (2015)

JSI (2015)

- 83% of respondents preferred 5-dose (n=45) or 5- and 10-dose (n=12) vials for MR. Primary reasons included reducing wastage and missed opportunities.
- Of 42 EPI managers interviewed, 25 preferred 5-dose and eight preferred mixed presentations. Only nine preferred 10-dose.

MR 5-DOSE ONGOING PROJECTS

CHOICES (Choice Optimization in Immunization: Country Exercises for Sustainability)

JHU (2021)

- Grant-based initiative that aims to i) equip global partners with evidence-based resources, guidance, and frameworks to support countries in strengthening their decision-making, and ii) empower and equip EPI in LIC/LMIC to navigate expanding vaccine product and schedule options and implement optimized, comprehensive communicable disease prevention and control programs, covering Rota, PCV, MR, and HPV.

Ethiopia measles 5-dose study

CDC, WHO, JSI, Ethiopia MOH (2021)

- Ongoing study to estimate the effect of HCW education and switch to 5-dose vials on measles coverage. Study team anticipates results in Q1 2022.
- Secondary and tertiary aims include estimating the effect on intervention timelines, caregiver attitudes, and wastage and cost.
- Baseline survey found that:
  - 23% of parents reported they were turned away for measles vaccination and the primary reason was that not enough children were present
  - 69% of healthcare providers reported turning away children for measles vaccination because they came on a non-measles vaccination day
  - 59% of providers preferred a 5-dose vial

DOSE PER CONTAINER PARTNERSHIP RESOURCES

Immunization dose per container decision support resource

DPCP (2019)

- A resource for programmatic decision-makers on assessing the trade-offs between cost and immunization systems impact when choosing dose per container (DPC).
- This decision support resource is organized by five broad steps to take when an immunization program is considering DPC for a specific vaccine.

Programmatic Implications of Vaccine Doses Per Container: Summary, Findings, & Moving Forward

DPCP (2017)

- PowerPoint presentation to the Bill & Melinda Gates Foundation in 2017 regarding the partnership, summary of findings, and next steps.
- Several highlights: 1) healthcare worker fear of wastage and stockouts leads to missed opportunities to immunize; 2) EPI manager preferences for 5-dose vials; 3) disconnect between national and higher-level stakeholders and frontline healthcare workers; and 4) key findings from the Zambia study.

DPCP Snapshot: Immunization tools to help the dose per container decision

DPCP

- DPCP conducted a review of 10 frequently used immunization tools that include inputs or outputs related to doses per container.
- DPCP concluded that current immunization tools do not allow predictions of how DPC changes would affect the immunization system.

DPCP Snapshot: Vaccination in Zambia – healthcare worker experiences using 5-dose MR vaccine

DPCP

- An overview of qualitative research that focused on managers' and providers' experiences with this lower-dose presentation, including perceived advantages and challenges. The main findings included:
  - When comparing a 10-dose vial to a 5-dose vial, district staff and HCWs felt that the 5-dose vial could help to reduce missed opportunities as they would be more likely to open the vial when only a few eligible children were present.
  - Many HCWs said that the 5-dose vial increased efficiency by reducing time spent waiting for the minimum number of children to arrive, giving them time to attend to other duties—but some said that reconstituting and transporting the lower-dose vials presented challenges.
  - Some HCWs reported that they are now vaccinating daily with the lower-dose presentation, while others retained scheduled vaccination sessions.

DPCP Snapshot: Vietnam – the effects of changing dose per container on the immunization system

DPCP

- An analysis of how the open vial policy affected immunization coverage and wastage, frequency, timeliness, safety, economic impact, and manufacturer's choices. The main findings included:
  - Except for a few regional variations, HCWs adhere to the national policy of opening a vial for every child as immunization sessions are often only held monthly; this is coupled with many mobilization strategies to ensure coverage targets are reached, yet wastage is still high, especially in higher-dose presentations.
  - Respondents at all levels of the immunization program expressed a preference for lower-dose presentations in order to reduce wastage. However, DPCP's cost analysis suggested that such changes would only be cost-effective for higher-priced vaccines (pentavalent, JE, and MR).
  - In the past, domestic government manufacturers have changed DPC in response to a request by the national immunization program and through a consultative process considering program need, cost, and cold chain constraints.

Dose Per Container Partnership

DPCP (2018)

- PowerPoint presentation to the Immunization Practices Advisory Committee, which provides an overview of key findings from surveys, interviews, and literature reviews in the Philippines, Ghana, Côte d'Ivoire, Mozambique, Nepal, Senegal, Uganda, Zimbabwe, Benin, DRC, Zambia, and Vietnam.
- Overall conclusions included:
  - Dose per container decision-making is a top-down process, with little input from subnational implementers
  - Driven by product availability, not demand driven
  - Different products may have different benefits in different contexts (urban/rural and fixed site/mobile, for example)
  - Evidence gaps need to include DPC in program planning and product selection

DPCP Snapshot: Information gaps in decision-making on vaccine presentation in 3 francophone African countries

DPCP

- A study by the DPCP in three Francophone African countries (Benin, Côte d'Ivoire, and the DRC) examined the vaccine selection process and found that:
  - Decisions on changes in vaccine presentations are heavily influenced by market availability and procurement agencies, with limited input from the Ministry of Health (MOH) or other country-level actors.
  - Procedures for deciding on changes in dose per container (DPC) are insufficiently defined and in-country program leaders lack the information and evidence they need to examine these changes comprehensively.
  - Actors across all three countries had similar views of the potential advantages of a change to a lower-DPC presentation: decreased wastage and increased coverage—weighed against the potential disadvantages of increased management complexity and cold chain capacity requirements.

DPCP Snapshot: Ghana – understanding changes in vaccine presentation

DPCP

- In 2012, the government of Ghana changed the number of doses per container (DPC) for two vaccines—yellow fever and pentavalent. This 2016 study examined how the government decided on these changes and found that:
  - Decisions are based on what products are available on the global market and on easily quantifiable factors, such as cold chain capacity and per-dose purchase price. Decision-makers prefer options that reduce cold chain storage requirements.
  - Stakeholders at the highest levels generally make decisions on DPC, with little input from those working at lower levels, such as frontline healthcare workers.
  - National- and facility-level stakeholders have different perceptions of how well the health system might manage multiple DPC presentations of the same vaccine.

DPCP Snapshot: modeling to support decision-making for 5-dose measles rubella routine vaccination in Zambia

DPCP

- The HERMES Logistics Modeling Team used computer simulation modeling to analyze the different effects of tailoring measles-rubella (MR) vaccine in 5-dose and 10-dose vials to different scenarios in Zambia's routine immunization program. Key findings included:
  - Replacing 10-dose MR with 5-dose MR at all health facilities led to the largest reduction in open vial wastage
  - Shifting to 5-dose MR vials requires procuring fewer MR doses
  - Shifting to 5-dose MR vials can increase the number of MR doses administered
  - Tailoring 5-dose vials to be used only at rural health facilities or by session sizes with fewer than an expected five or ten children is the most beneficial

DPCP Snapshot: Senegal – weighing the costs and benefits of changing DPC

DPCP

- DPCP examined the relationship between dose per container (DPC) for the vaccines in the Senegalese Expanded Programme for Immunization (EPI) and tradeoffs in terms of wastage, cost, coverage, timeliness, safety, healthcare worker (HCW) behavior, and supply chain and cold chain effects. The study found that:
  - HCWs and managers took DPC into account in planning and implementing the immunization program and HCWs employed a range of "workaround" strategies with multi-dose presentations to reduce wastage and increase coverage.
  - High DPC vaccines such as 5, 10, or 20 that could be kept for up to 28 days after opening had similar vaccine wastage rates to single-dose presentations; thus, higher DPC does not necessarily translate to more wastage, possibly due to the work-arounds.
  - Reducing DPC of more expensive vaccines may reduce overall costs. An economic analysis of three multi-dose vaccines with six-hour viability after opening showed that for two vaccines, switching to a lower DPC may not yield economic benefits because savings from reduced wastage may not outweigh the higher price per dose—but for one more expensive vaccine, lower DPC could reduce overall costs.

DPCP Snapshot: Measles vaccination in Zambia – balancing coverage and wastage

DPCP

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