

Components of Immunization Costs

KEY POINTS

- * Immunization costs include vaccines, labor, supplies, transportation, operations and maintenance, cold chain equipment, and capital investments in buildings and technology. Labor and vaccines are the major cost components.
- * Delivery costs (non-vaccine costs) account for nearly half of immunization costs.
- * In health facilities and at the administrative level, immunization costs are typically shared across multiple health services and activities; adequately budgeted and staffed primary health services are thus essential to delivering comprehensive immunization services.
- * Recent studies on immunization costs have found significant variation in total facility and unit costs within and between countries.
- * High-volume health facilities tend to have lower immunization costs per child than facilities in rural areas. This should be taken into consideration in budgeting and resource allocation.
- * New vaccine introduction requires one-time startup costs—such as for training, printing of materials, and adjustments to the cold chain—that must be adequately budgeted for.

COUNTRIES NEED TO understand the key components of immunization costs in order to effectively budget for, finance, implement, and maintain a comprehensive immunization program. Immunization costs can be difficult to disentangle because they occur at different levels of the health system—from the centralized coordinating agency to the point of service delivery—and include several major components that may be financed differently. These include procurement of vaccines and injection supplies, supply chain and logistics, and immunization at the point of use.

At the health provider or facility level, where service delivery is integrated and health staff provide a range of services, inputs related to immunization delivery are shared. (See Brief 2.) The health worker who vaccinates children in a health clinic may also provide other services, possibly during the same visit. Although these inputs and costs may be difficult to disaggregate by health service, ensuring that financing is adequate to cover all shared costs at the facility level is essential for immunization service delivery.

This brief draws on the recent six-country Expanded Program on Immunization Costing and Financing of Routine Immunization (EPIC) studies. The first studies, conducted in 2012 and 2013, used a common approach to estimate routine immunization costs in Benin, Ghana, Honduras, Moldova, Uganda, and Zambia. (The data and associated materials, including data documentation, data collection instruments, and presentations of analytical results, can be found at www.immunizationcosting.org.)

MAJOR COST COMPONENTS OF IMMUNIZATION SERVICES

The costs of immunization programs fall into two major categories:

- **Vaccines and injection supplies.** Total costs include delivery to the country, fees associated with clearing customs, import taxes, and procurement fees, if relevant.

* Other sources of data on immunization costs include estimates contained in country-specific comprehensive multi-year immunization plans, estimates used in cost-effectiveness studies, and earlier primary data collection efforts.

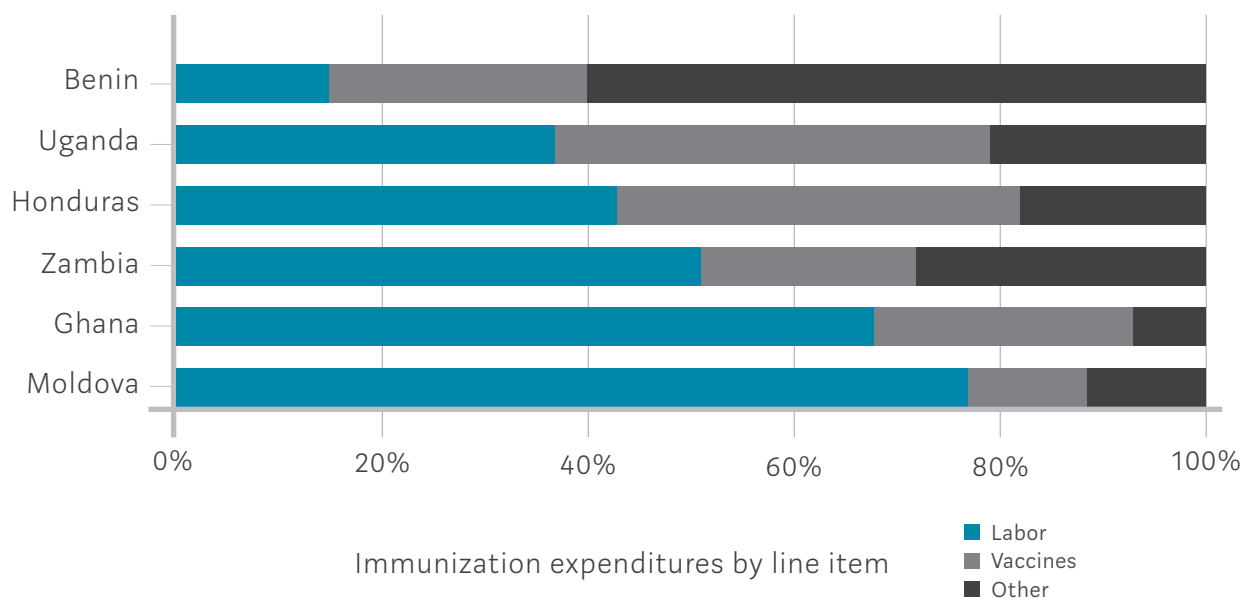
- Immunization delivery.** These costs are extensive and include the cost of health worker time to administer vaccines and costs related to training, planning, management and supervision, social mobilization, surveillance, and monitoring and evaluation. They also include supply chain and logistics costs, including for cold chain equipment and overheads, vehicles, transportation, and personnel time involved in the storage and delivery of vaccines to point-of-care settings. The supply chain has both recurrent and capital costs. Recurrent costs include transportation fuel, use of refrigeration units, salaries, and the maintenance of cold chain equipment (which is frequently underbudgeted in immunization planning). Capital expenditures include the purchase of new trucks, motorcycles, and refrigeration units.

COSTLIEST INPUTS AND ACTIVITIES

The EPIC study identified labor as the largest cost in routine immunization, accounting for an average of 49% of all costs across the six countries, ranging from a low of 15% in Benin to 77% in Moldova in 2011. (See the figure below.) The share of a country's immunization labor costs tends to correlate with its level of economic development, with more developed countries having higher health worker salaries and therefore higher proportional costs for labor than in less developed countries.

Vaccines and injection supplies are the second-largest cost category, accounting for an average of 27% of total immunization costs. Since vaccines

ROUTINE IMMUNIZATION EXPENDITURES IN SIX COUNTRIES (2011)



Note: "Other" includes supplies, maintenance, utilities, transportation, per diem, printing, taxes, vehicles, cold chain equipment, other equipment, vehicles, and unallocated.

Source: Brenzel et al., *Health Affairs* (2016)

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are such a large share of total costs, efficient procurement and careful choice of presentation (the number of doses and total volume per vial) are critical to determining the cost of services. (See Briefs 4, 11, and 12.)

Administration and management costs above the facility level account for about 15% of total routine immunization costs.

COST PER FULLY IMMUNIZED CHILD

The EPIC study found that the cost per fully immunized child was about US\$60 in Ghana, US\$132 in Honduras, and US\$332 in Moldova in 2011. These figures are much higher than those found in detailed cost studies covering the previous 10 to 20 years, when countries had many fewer vaccines in their schedules. For example, the estimated cost per fully immunized child (for routine vaccinations only) in Ghana was about US\$10 in 2001. The EPIC study found that in Honduras, 20% of the cost per fully immunized child was for the two most recent vaccine introductions, for rotavirus and pneumococcus.

HOW FACILITY VOLUME AFFECTS COSTS

The EPIC study showed wide variations in total and unit costs for immunization, with higher-volume facilities typically having lower unit costs (per dose given or per child vaccinated) because the fixed costs are spread over a greater number of outputs. Rural facilities tend to have lower volume because they serve sparsely populated areas, and they thus have markedly higher costs per dose compared to urban and peri-urban facilities. In Honduras, for example, the facility-level delivery cost per dose (excluding vaccine costs) ranged from about US\$1.6 in hospitals to US\$7.7 at rural vaccination posts. The study noted that achieving high immunization coverage in more rural areas of Honduras could cost more per dose than in highly populated areas.

HOW THE DELIVERY PLATFORM AFFECTS DELIVERY COSTS FOR NEW VACCINES

Evidence on how the delivery platform affects incremental delivery costs for new and underused vaccines is limited. However, it shows that school-based delivery strategies are more costly for human papillomavirus (HPV) vaccination than health-facility-based delivery (although the former may be needed in places where it is the more effective strategy).

STARTUP COSTS FOR NEW VACCINE INTRODUCTION

New vaccine introduction involves costs for procuring the vaccine and associated injection supplies as well as incremental delivery costs. It also involves costs for an array of important one-time startup activities that might include training of health workers, social mobilization, microplanning, and printing of new vaccine cards and training materials.

New vaccines may require additional investment in cold chain storage. However, certain combination vaccines (such as pentavalent or hexavalent vaccines) may replace several previously separate vaccines, thereby reducing demand for cold chain space and injection supplies.

GAPS IN COST DATA

Detailed costing studies have shown large variations in immunization delivery costs across countries, although substantial data gaps exist when it comes to delivery costs in Central Asia, South Asia, and Europe. Also, fewer studies have been conducted on immunization costs in low-income countries than in middle-income countries. Many countries have added vaccines to their immunization schedules in recent years, so older cost studies might be outdated or handle shared costs in an inconsistent way.

The most recent cost studies cover routine immunization. Less information is available on the cost of supplementary immunization activities, which aim to reach large populations that might have been missed by routine immunization services

and often immunize children whatever their vaccination history. More evaluation is needed on the costs of various delivery platforms, the costs of achieving higher coverage and greater equity, and the costs of better-quality services.

SOURCES AND FURTHER READING

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