The True Cost of Delivering COVID Vaccines: Nepal

As of December 6, 2021, 19.2 million doses of COVID-19 vaccines had been administered in Nepal, with 36% of the population recieving at least one dose of the vaccine. After a rough road with unpredictable vaccine supply, the government has been able to procure several million vaccine doses. Now delivery at the last mile is the biggest hurdle Nepal faces. Nepal's Minister of Health says, "We are not going have shortages of vaccines anymore, but **our main concern and focus now is on getting these vaccines to all corners of the country**, including the remote mountain areas."

$18 per person

Cost to deliver COVID-19 vaccines in Nepal.

Based on national data and in-depth studies in 2 health districts, CARE estimates that delivery costs from "tarmac to arm"[1] for COVID-19 vaccines in Nepal are **$8.35 (1,019 NPR) per dose of vaccine administered, or $18.38 (2,241 NPR) per person fully vaccinated (on a two-dose regimen).**[2]

In Nepal, it costs 5 times more (or higher) to deliver COVID-19 vaccines than current global projections estimate.

This is **nearly 5 times more expensive** than current global estimate for delivery costs. These costs range from $11 per fully vaccinated person in easier to reach areas, to $33 per dose in remote, difficult to reach areas. Gaps in vaccine coverage are particularly acute for mountainous areas, people with low mobility, and communities far from health centers. Even the lowest-cost estimates for the easiest to reach areas are nearly 3 times higher than global average estimates.

70% of these costs are personnel needs to ensure vaccines reach people at the last mile. This points to a major need to improve investments in vaccine delivery, especially for the health care workers who administer vaccines and ensure everyone gets vaccinated.

[1] "From tarmac to arm" includes only the costs of last-mile delivery of the vaccine. It excludes the price of purchasing vaccines or delivering them from the manufacturer to Nepal.
[2] UNICEF estimates the cost of delivering the second vaccine is 1.2 times the original dose to account for wastage of doses.

Emily Janoch | Emily.janoch@care.org

Nepal Context

While Nepal's vaccination rates (36%)[3] far exceed the 7% average for low-income countries,[4] there are still significant challenges to getting vaccines to everyone who needs it, especially at the last mile. Nepal is an important case study because it has a strong existing vaccination system—with 96% of children receiving all of their routine vaccinations in 2019. As a lower-middle income country that has made substantial investments in vaccines over the last two decades, and significant commitments to rolling out the COVID-19 vaccine, Nepal is a striking case of how **even robust systems face major challenges and costs when delivering COVID-19 vaccines**. This is not a case of a fragile or failing health system; it is a case of a health system rolling out **a new vaccination** to people childhood vaccination systems do not reach and **trying to reach 70% of the adult population**.

Nepal demonstrates that existing health systems need much more investment and support to achieve enough COVID-19 vaccination to curb the spread of the pandemic. Nepal is hopeful they will be able to vaccinate 70% of their population, but meeting that target requires substantial new investments. It will also require careful attention to ensure vaccines reach all people equally, regardless of gender, disability status, or location.

Nepal has identified 4 main constraints to its COVID-19 vaccine delivery: the **number and capacity of frontline health workers** responsible for delivering the vaccines, the **quality of information** and **tracking systems** for vaccination recording and reporting, **public awareness** about the safety and efficacy of vaccinations and **targeting and delivery strategies to reach** poor and disadvantaged communities.

Thus far, Nepal's vaccination campaign has relied on health centers as the distribution point for COVID-19 vaccines. While that generates efficiencies in terms of cost and distribution, it leaves out significant portions of the population. Women have less access to transportation, and therefore have to pay more to get to a health center. Women are also more likely to be responsible for finding childcare or taking children with them if they go to get a vaccine—increasing their burden to get a vaccination. People in communities farther away from health centers are often in poorer and more rural areas. This means **the people who can least afford to travel are bearing the highest cost of going to a health center to get their COVID-19 vaccine**. People with disabilities also have less access to health centers. Nepal is starting to consider investments in mobile vaccination clinics in order to reach the people who are struggling to get to COVID-19 vaccines. This investment must happen as quickly as possible, and specifically work to reach the people who cannot easily travel to health centers.

What is included in these costs?

Nepal is working to supplement their existing health care system to achieve COVID-19 vaccination targets. That includes the need to hire more vaccinators and surge capacity across the health system, reinforcing cold chains and infrastructure, and substantial investments in community mobilization and outreach. It also includes the costs of salaries, transportation, and training for existing health workers. The data in this case study comes from 3 sources: national health system data, health-center specific costs in the Bajura district, and center-specific costs in the Humla district. These districts are especially important because they lie in the more mountainous areas of Nepal and face specific challenges getting vaccines to the last mile. For the

70%

of the vaccination cost is to pay for human resources

[3] Vaccination rate for fully vaccinated people in Nepal as of January 4, 2022. Data accessed online https://ourworldindata.org/covid-vaccinations on January 10, 2022.

[4] Nepal is a lower middle-income country. However, data available disaggregates by low-income countries

purposes of this case study, the primary numbers represent the Bajura district as the moderate estimate between very accessible areas and the high estimate in Humla, one of the hardest-to-reach areas.

Staff salaries, allowances, and supervision include the cost of salaries and per diems for existing vaccinators, volunteers, and health workers supporting COVID-19 vaccinations. That accounts for **70% of the total vaccination costs, or $5.85 per dose**. Nepal's Ministry of Health has announced that they will be hiring new vaccinators to fill the gaps in vaccine delivery and raise their vaccination rates. Even with this as the largest percentage of costs, there are still two categories of volunteers—those who work at health centers and Frontline Community Health Workers—who are not receiving salaries for their work. Health center volunteers get a daily allowance of $3.30 per day they volunteer. At the community level, the community health workers recieve a total of $4.22 per day they volunteer to cover transportation ($3.38) and food ($0.84).[5]

Social Mobilization. Working with district leaders, journalists, and community level committees to promote COVID-19 vaccination rates and ensure they have the information they need to support and encourage others to get ready for vaccines. This costs **127 NPR ($1.04 USD) per dose, or 12% of the total cost to deliver one dose**.

Cold chain and infrastructure. 12% of the delivery costs are reinforcing cold chain to allow for ultra-cold chain vaccinations like Pfizer and Moderna, as well as ensuring infrastructure improvements for COVID-19 vaccines to be available at the last mile. That is 119 NPR, or $0.97 USD. 44% of health centers in Nepal lack access to the power grid, and so either cannot run refrigerators, or must rely on generator power. With the ultra-cold chain requirements for many COVID-19 vaccines, health workers who would normally be able to travel to a district to run a vaccination campaign over several days must return to district capitals each night to have adequate cold chain facilities. This triples the travel time for vaccinators and reducing the number of hours available to administer vaccines. Reinforcing cold chain will reduce these burdens and speed up the delivery process.

An additional 14 NPR ($0.11 USD) are going to PPE, safety equipment, syringe disposal, and drinking water and handwashing supplies for vaccination teams. That's **1% of the total budget going to keep vaccinators and their teams safe from COVID-19.**

Training and preparing health workers. 2% of the budget goes to training health workers at all levels. 23 NPR ($0.18 USD). That includes both training sessions, the training materials, and the reporting and tracking tools health workers need to monitor progress on COVID-19 vaccination targets.

Vaccine transportation. Vaccine supply management and corresponding information systems is **4% of the total vaccination cost**. This includes transportation costs from the central level—the tarmac—out to the last health post. That cost is 32 NPR per dose, or $0.26 USD.

[5] This is a total of 500 NPR per day, set by government standards for local volunteer compensation. 400 NPR are for transportation, and 100 NPR for refreshments.

Who is included in these costs?

Health workers are the most important part of the equation. The human resources needed to deliver vaccines require not just people injecting vaccines, but also data analysts, health center supervisors, registration officers, security personnel, and a host of volunteers. The salary costs include the following personnel:

- **Vaccinators.** Each vaccinator is estimated to vaccinate 125 people per day. A single vaccinator's salary is 720,000 NPR ($5,940 USD) per year and COVID-19 vaccination is expected to represent half of their time for 18 months. Vaccinators are also paid and additional 700 NPR ($5.77 USD) per day when they travel for vaccinations to offset travel and food costs. Between salaries and allowances, **costs for vaccinators represent 26% of the total cost of vaccinations—or $2.22 per dose**.
- **Support staff.** Support staff include other health workers at a health center who are involved in organizing COVID-19 vaccination campaigns, including logistics, data entry, registering participants, and setting up the vaccination sites. These staff make the same salaries as vaccinators, and there is one support staff member for every 2 vaccinators. Collectively, that's **128 NPR ($1.02 USD) per dose, or 13% of the total cost**.
- **Security staff.** Security staff help ensure the safety of vaccines and health centers. They earn 120,000 NPR ($990 USD) per year, and there is one security staff member for every 2 vaccinators. Those security staff make up **2% of the overall cost, or 21 NPR ($0.17) per dose**.
- **Health center volunteers.** Each health center has 3 volunteers helping with vaccination setup and organization. Those volunteers receive an allowance of 400 NPR ($3.30 USD) per day that they volunteer. Costs for supporting the volunteers are **12 NPR ($0.09 USD) per dose, about 1% of the cost per dose**.
- **Community health volunteers.** Each community has a number of volunteers that help with organizing campaigns in communities, informing and educating community members about COVID-19 vaccines, registering people for vaccines, and generally promoting COVID-19 vaccinations. Overall, there are 52,000 frontline community health volunteers in Nepal. These volunteers receive a small stipend on days when they are supporting vaccination efforts—500 NPR. The total cost of these volunteers is 50,000 NPR ($413 USD) per community. Together, **these volunteer costs represent 2% of the total budget, or $0.22, per dose**.[6]
- **Supervision and organization.** Supervision from all levels of the health system—such as salaries for the district health coordinator, health center directors, or the district information officer—and from other organizations supporting the vaccination efforts account for **23% of the total vaccination cost. That's 232 NPR ($1.91 USD) per dose**.

Authors

This brief was written by Emily Janoch, Santa Dangol, and Nilkantha Pandey with inputs from Caitlin Shannon and Mona Sherpa. The information in this brief is up to date as of January 10, 2022. Further updates will be made as more data becomes available.

[6] If volunteers were receiving minimum wage in Nepal (361 NPR or $3 USD per day), that would increase the price by 33 NPR ($0.27) USD per dose.