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Costs of delivering COVID-19 vaccines in 92 COVAX Advance Market Commitment economies

COVID-19 Vaccine Delivery Costing Working Group

Ulla Griffiths (ugriffiths@unicef.org) (UNICEF), Logan Brenzel (BMGF), Stephen Resch (Harvard University), Allison Portnoy (Harvard University), Alex Adjagba (UNICEF PD), Marcia Attaran (UNICEF SD), Karene Yeung (WHO), Raymond Hutubessy (WHO), Nathalie Van de Maele (WHO), Wei Aun (WHO consultant), Anne Cronin (GAVI), Simon Allen (GAVI), Laura Boonstoppel (ThinkWell), Christina Banks (ThinkWell), Sarah Alkenbrack (World Bank)

Objectives of COVAX working group on delivery costs

Three main support topics:

- Global cost estimates to inform fundraising for the COVAX pillar of the ACT-Accelerator
- Planning and budgeting for partners and AMC92 economies
- Financing allocations – who will pay for what and how much?

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THINKWELL

HARVARD SCHOOL OF PUBLIC HEALTH

World Health Organization

WORLD BANK GROUP

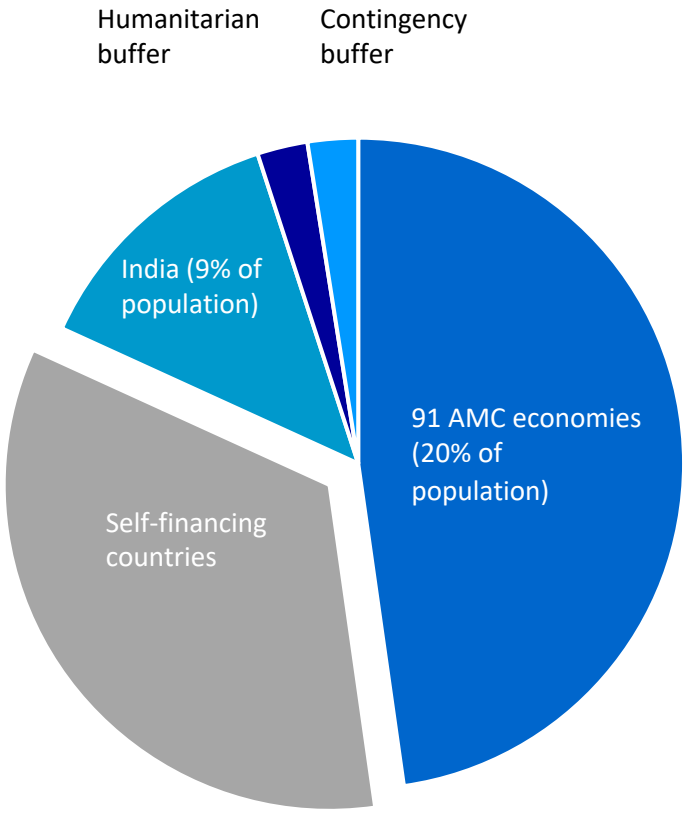
Gavi The Vaccine Alliance

*A **cross-organizational** working group supporting **planning**, **budgeting**, **fundraising** and **financing** of **COVID-19 vaccine delivery** for AMC92 economies*

Two billion COVID-19 vaccine doses expected for COVAX during 2021

Allocation of 2 billion doses*

• AMC91	955.2 million	**1.219 billion doses**
• India	263.8 million	
• Humanitarian buffer	50 million	Excluded from the delivery cost analysis
• Contingency buffer	50 million	
• Self-financing countries	681 million	



Assumptions made for cost estimates:

- *2-dose schedule*
- *10-dose vial*
- *10% vaccine wastage*
- *2-8°C cold chain storage*
- *Syringes and safety boxes bundled with COVID-19 vaccine and not included in delivery costs*

Number of people predicted to be vaccinated in AMC92 during 2021 with the allocation of 1.219 billion doses (vaccination coverage)

1. Core health workers through fixed site delivery
2. 65+ years through outreach
3. 50-64 years through outreach
4. Less than 50 years through outreach

	Core health workers	65+ year old	50-64 years old	Less than 50 years	Total
Gavi eligible (n=57)	4,137,445 (90%)	58,610,676 (80%)	125,013,809 (77%)	118,073,630 (7%)	305,835,560 (17%)
India (n=1)	5,981,983 (90%)	75,489,372 (80%)	37,238,646 (21%)	-	118,710,001 (8%)
Gavi transitioned (n=12)	1,682,149 (90%)	24,818,635 (80%)	37,024,751 (63%)	3,938,419 (1%)	67,463,954 (17%)
Non-Gavi (n=22)	1,587,903 (90%)	16,251,415 (80%)	29,896,964 (77%)	6,535,467 (2%)	54,271,749 (17%)
Total (n=92)	**13,389,480 (90%)**	**175,170,099 (80%)**	**229,174,171 (52%)**	**128,547,515 (4%)**	**546,281,265 (14%)**

Vaccine wastage assumption of 10% leads to less than 20% of population vaccinated

Total costs of delivering 1.219 billion doses in 92 AMC economies

		Total (US$ millions)	Costs per dose supplied (US$)	Costs per person vaccinated with two doses (US$)*	Percent of total
In-country delivery costs	Gavi eligible (n= 57)	951	1.39	3.11	47%
	India	283	1.07	2.39	14%
	Gavi transitioned (n=12)	250	1.66	3.70	12%
	Non-Gavi (n=22)	238	1.97	4.39	12%
	Subtotal	*1,722*	*1.41*	*3.15*	
	Technical Assistance	198	0.16	0.36	10%
	Global and regional activities	98	0.08	0.18	5%
	Total	2,019	1.66	3.70	100%

Costs are valued in financial terms. Costs represent the additional health sector expenses needed for vaccine delivery when existing health system components are leveraged. Hence, resources already in place in the health system, such as health worker salaries, are not included. Costs of hiring additional health workers are not included either.

Assumption of 10% vaccine wastage explains difference in quantities between doses supplied and doses delivered

Unit cost assumptions (US$)

Cost category	Fixed site per dose	Outreach per dose	Per health facility	Per country	Per large/conflict country	Adjusted for Purchasing Power Parity (PPP)
Planning and coordination				590,000	800,000	No
Training			63			Yes
Social mobilization:						
Behavioral data				30,000	100,000	No
Social media listening				Country specific		Yes
Community activities			750			No
Cold chain equipment				Country specific		No
Cold chain recurrent	0.01	0.01				No
Pharmacovigilance			79			No
Vaccination certificates	0.03	0.03				No
Personal Protective Equipment	0.07	0.11				No
Hand hygiene:						
Sanitizer	0.1	0.1				No
Water				Country specific		Yes
Soap		0.01				No
Buckets			12			No
Vaccine transport	0.04	0.04				Yes
Waste management	0.044	0.044				No
Per diem for outreach		1.39				Yes
Transportation for outreach		0.49				Yes

In-country costs of delivering 1.219 billion doses (million US$)

Cost category	Upfront costs	Recurring costs		Total costs	Percent of total
		Facility	Outreach		
Planning and coordination	68.35	-	-	68.35	4%
Training	16.64	-	-	16.64	1%
Social mobilization	316.26	-	-	316.26	18%
Cold chain equipment (2-8°)	137.94	-	-	137.94	8%
Cold chain recurrent		3.15	8.99	12.15	1%
Pharmacovigilance	32.12	-	-	32.12	2%
Vaccination certificates	-	10.11	28.81	38.92	2%
Personal protective equipment	-	20.91	99.33	120.23	7%
Hand hygiene	5.08	31.42	99.27	135.76	8%
Vaccine transport	-	7.43	17.53	24.96	1%
Waste management	-	13.88	39.56	53.44	3%
Per diem for outreach	-	-	565.44	565.44	33%
Transportation for outreach	-	-	199.81	199.81	12%
TOTAL	**576.38**	**86.89**	**1,059**	**1,722**	**100%**
Percent of total	**33%**	**5%**	**61%**	**100%**	

Upfront costs: *Activities needed prior to vaccine administration*

Recurring costs: *Activities undertaken during vaccine administration*

In-country costs per dose supplied: US$ 1.41

Costs of technical assistance (US$)

Cost category	In-country delivery costs (US$)	Percent of value needed for TA	TA costs (US$)
Planning and coordination	68.35	20%	13.67
Training	16.64	20%	3.33
Social mobilization	316.26	20%	63.25
Cold chain equipment (2-8°C)	137.94	20%	27.59
Cold chain recurrent	12.15	5%	0.61
Pharmacovigilance	32.12	20%	6.42
Vaccination certificates	38.92	10%	3.89
Personal protective equipment	120.23	10%	12.02
Hand hygiene	135.76	10%	13.58
Vaccine transport	24.96	20%	4.99
Waste management	53.44	20%	10.69
Per diem for outreach	565.44	5%	28.27
Transportation for outreach	199.81	5%	9.99
TOTAL	1,722	100%	198.30

Innovations planned for deployment during COVID-19 vaccine introduction

DIGITAL MICROPLANNING

Introduce decision-making steps and tools, such as GIS, spatial analysis, satellite imagery and artificial intelligence to optimize delivery

US$ 6.7 million in 2021

US$ 18.8m for 3 years

REAL-TIME MONITORING

Manage outreach and campaigns in "real time" with vaccinators receiving daily guidance by SMS or WhatsApp on communities to visit and target updates

US$ 3.4 million in 2021

US$ 19.3m for 3 years

US$ 33.6 million in 2021

US$ 77.8 million for 3 years

TRACEABILITY SOLUTION

Model that can be rapidly deployed at global and country level to support supply chain security and vaccine safety

US$ 11.25 million in 2021

US$ 19.0m for 3 years

DIGITAL TOOLS FOR SAFETY MONITORING

Either implement case-based safety data within DHIS2 or vigiflow management system for recording adverse events

US$ 1.2 million in 2021

US$ 2.7m for 3 years

SMART VACCINATION CERTIFICATES

Create interoperable standards for a global vaccine certificate system that allows for the diversity of solutions in countries to have trusted, cross-border data exchange

US$ 11.03 million in 2021

US$ 28m for 3 years

Costs of post-implementation evaluations (US$)

Evaluation topic	Number of studies	Cost per study	Total
Safety	30	150,000	4,500,000
Programmatic (early rapid PIE and full PIE 6-12 months after introduction)	100	35,000	3,500,000
Social and behavioural	15	150,000	2,250,000
Cohort studies for vaccine impact	4	375,000	1,500,000
Vaccine effectiveness	15	75,000	1,125,000
Costs and financing	8	60,000	480,000
Total			**13,355,000**

PIE: Post introduction evaluation

Implementation of studies is expected to last approximately three years

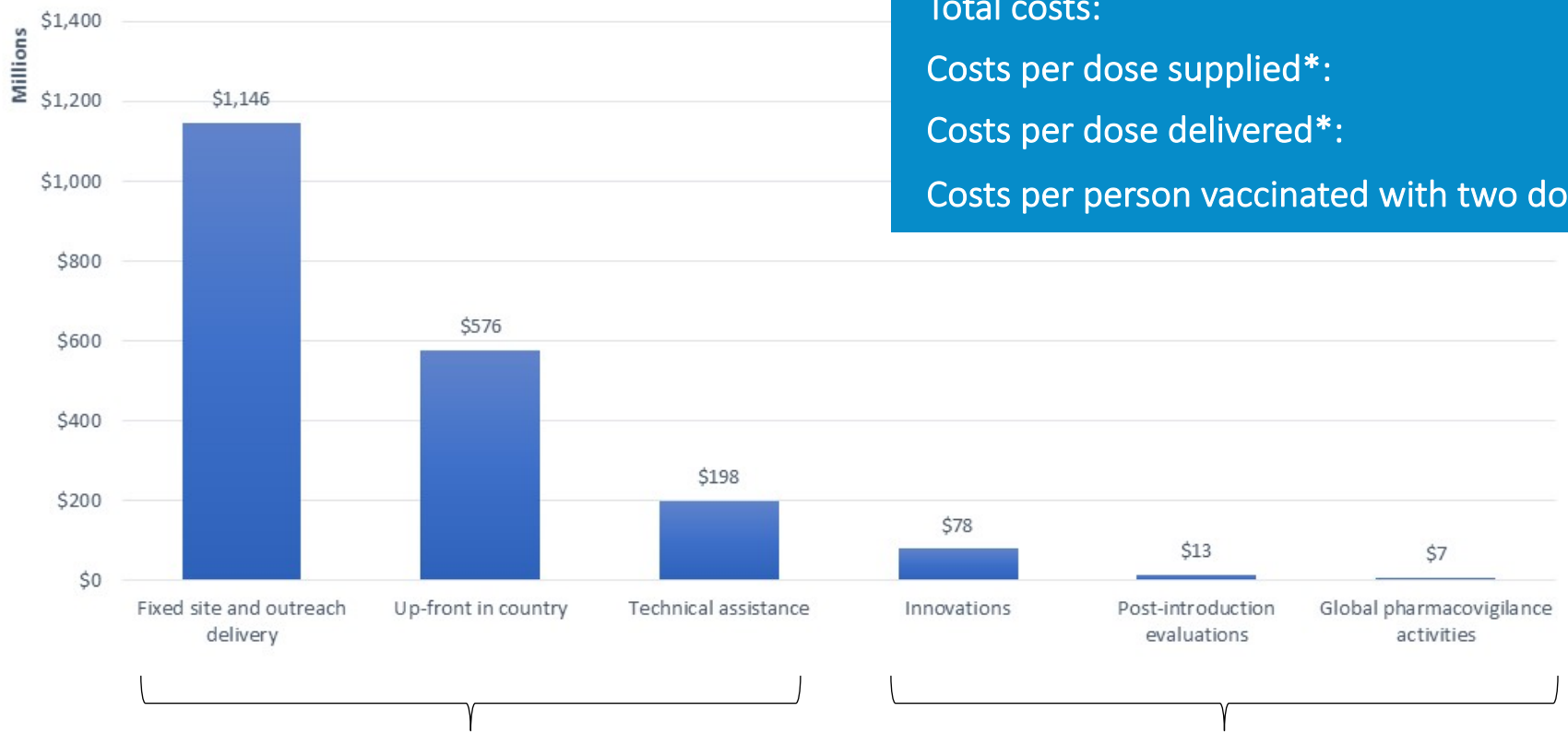
Costs of global and regional pharmacovigilance activities (US$)

Activity	Unit cost	Quantity	Annual costs	Costs for three years
Regional safety committees	150,000	10	1,500,000	4,500,000
Country engagement in global pharmacovigilance activities	10,000	92	920,000	2,760,000
Total			**2,420,000**	**7,260,000**

Total costs according to category (US$)

Category	Total costs (US$ million)	Percent of total
Fixed site and outreach delivery	1,146	57%
Up-front in country	576	28%
Technical assistance	198	10%
Innovations	78	4%
Post-introduction evaluations	13	1%
Global pharmacovigilance activities	7	0.4%
Total	**2,019**	**100%**

Total costs of delivering 1.219 billion doses in 92 AMC economies



Total costs:	US$ 2.019 billion
Costs per dose supplied*:	US$ 1.66
Costs per dose delivered*:	US$ 1.85
Costs per person vaccinated with two doses:	US$ 3.70

Difference between doses supplied and doses delivered is explained by the 10% vaccine wastage assumption

Limitations

- Cost estimates have been developed to facilitate fundraising at global level
  - Unit cost estimates should not be used for detailed planning and budgeting in individual countries
  - Costs of COVID-19 vaccine delivery will vary between countries due to price differences, diverse health system structures and divergent vaccine delivery strategies
- Unit cost estimates should be viewed as broad approximations with wide confidence interval
  - COVID-19 vaccine will be delivered to different population groups and in different manners than the studies and budgets of which approximations have been based upon
- Human resource costs only included as per diems
  - Salary costs are excluded