Gavi
The Vaccine Alliance

Annual Progress Report

Year 2
of our five-year strategy

2020
2019
2018
2017
2016

children immunised
65m
62m

Collaboration


Transition

Supply chains


Data


Fragility

What we have achieved together, 2000–2017

>690 million children
vaccinated through routine programmes

>760 million people
immunised through vaccination campaigns

>10 million lives
saved in the long term

>100 billion US$
generated through the economic benefits of immunisation[a]

387
vaccine introductions and campaigns

a – As of the end of 2016

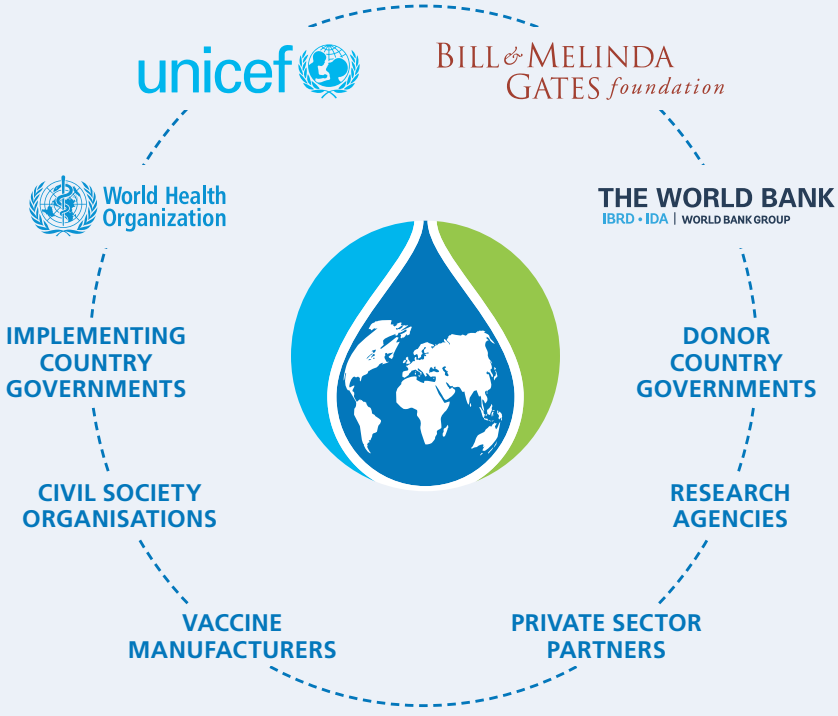
The Vaccine Alliance

Our 2016–2020 mission: saving children's lives and protecting people's health by increasing equitable use of vaccines in lower-income countries.

Our partners

Our partnership combines the technical expertise of the development community with the business know-how of the private sector.

- **WHO** regulates vaccines and supports country introductions, strengthening immunisation coverage and data quality.
- **UNICEF** procures vaccines and supports countries in maintaining their cold chain, improving access and collecting data.
- **The World Bank** helps pioneer innovative finance mechanisms like the International Finance Facility for Immunisation (IFFIm) and the Advance Market Commitment (AMC).
- **Bill & Melinda Gates Foundation**, one of our founding partners, provides funding and expertise, pioneers innovative approaches and supports research and development of new vaccines.
- **Implementing country governments** identify their immunisation needs, co-finance and implement vaccine programmes.
- **Civil society organisations** help ensure that vaccines reach every child.
- **Vaccine and cold chain equipment** manufacturers make available affordable, quality vaccines and cold chain equipment for developing countries.
- **Donor country governments** make long-term funding commitments.
- **Private sector partners** contribute resources, expertise and innovation to help achieve our mission.
- **Research agencies** help generate the evidence base and communicate the value of vaccines.



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> **Dr Seth Berkley**
> Chief Executive Officer

Immunisation: reaching the unreached

2017 Annual Progress Report

Dr Seth Berkley, Chief Executive Officer

> ***There is a need for an even greater collective commitment, increased focus on strengthening routine immunisation systems, and continued innovation and learning.***

Welcome to Gavi's Annual Progress Report for 2017, the second in a series of five covering our current strategic period. This report highlights some very encouraging results, but also identifies challenges that we need to tackle if we are to continue to make progress.

In 2017 we supported the vaccination of 65 million children – 3 million more than in 2016 – and we are well on track to achieve our mission target of immunising an additional 300 million children between 2016 and 2020. The breadth of protection has also increased, from 37% to 41%, with more countries offering a wider range of vaccines as part of their routine immunisation programmes than ever before.

This progress has been made despite the supply challenges we are continuing to experience for some vaccines, particularly inactivated polio vaccine (IPV) and human papillomavirus (HPV) vaccine. Supply shortages of these two vaccines, driven by a dramatic increase in demand, were one of the main reasons why in 2017 only 35 of the 50 planned introductions were possible.

Immunisation continues to be the most universal, cost-effective health intervention. Since our inception in 2000, the Vaccine Alliance has made huge progress in expanding access even further. Our work has helped to nearly halve the number of children in Gavi-supported countries who miss out on basic immunisation – from 28 million in 2000 to just over 16 million today. This has been achieved despite a 15% increase in the number of children surviving beyond 12 months in Gavi-supported countries since 2000.

We have seen a welcome improvement in coverage with the third dose of diphtheria-tetanus-pertussis-containing vaccines (DTP3), such as pentavalent, in this strategy period, with a 1 percentage point increase over the 2015 baseline. While this is a start, it is not as much as we would have liked – being below our targeted rate of increase. It highlights the need to accelerate progress further with an even greater collective commitment, increased focus on strengthening routine immunisation systems, and continued innovation and learning.

This is particularly true in countries and areas that are suffering from fragility. Irrespective of the cause – be it conflict, economic decline or the results of climate-related pressures – people living in areas deemed to be fragile are most in need of the protection immunisation offers, but are inherently difficult to reach.

In such settings, immunisation campaigns often play an important role in rapidly protecting large numbers of vulnerable people from disease. But for many countries, reliance on repeated campaigns can be a contributor to the problem rather than a long-term solution. Too much focus on expensive mass immunisation campaigns, which often come in response to an outbreak, takes health workers away from routine services and detracts from where the real focus should be – on strengthening routine immunisation services and building strong primary healthcare systems. This is one reason why we have not seen measles vaccine coverage increase since 2015. Yellow fever is another case in point: while effort and resources are used to tackle outbreaks through campaigns, routine coverage has remained at below pre-2009 levels for the last five years.

Dr Seth Berkley during a visit to a health centre in Vaingandrano, Madagascar

Gavi/2016/Randrianarivony Voara

However, while the issue of coverage remains critical, it should not detract from the progress we have made in other areas. Gavi's market shaping efforts, for example, have continued to deliver by promoting competition and improving the health of vaccine markets. As a result, in 2017 we saw the cost of fully immunising a child with pentavalent, pneumococcal and rotavirus vaccines fall to US$ 16.63, a reduction of 12% from 2016. In another testament to the continued success of the Gavi model, 8 countries transitioned out of our financial support by the end of the year, bringing the total to 16. This means that we are firmly on course to reach our target of 20 transitioned countries by 2020.

All this stands us in good stead for our mid-term review in Abu Dhabi in December 2018, where we will report on our progress to our donors. However, as we get closer to 2020 and start thinking about our next strategic period, it is vital that we continue to focus on the challenges highlighted in this report. Because the 2021–2025 period, or "Gavi 5.0", is likely to present a whole new set of challenges, getting coverage on an upward trajectory again is a number one priority. With renewed focus from countries and partners, we can make sure that no child is left behind.

Dr Ngozi Okonjo-Iweala, Board Chair

> ***To keep immunisation levels high post-transition, we will continue our engagement with transitioning countries and provide them with the support they need to succeed.***


Gavi/2017/Christos Papageorgiu

One of the year's recurring themes was "collaboration". Throughout 2017, Gavi found new ways to work with partners to overcome challenges, both old and new. For an alliance such as ours, that is just how it should be.

With more than 60 partners now on board, our partners' engagement framework (PEF) is delivering new ways of working thanks to its inherently country-centric approach. In its first two years of operation, PEF has funded more than 200 WHO and UNICEF country office staff positions dedicated to immunisation.

Our new fragility, emergencies and refugee policy is another novel way in which we are working more closely with countries. Introduced in June 2017, this policy enables Gavi to respond more quickly and with greater flexibility than ever before, allowing countries to boost the number of people in fragile settings receiving vaccines.

This has never been more needed. In 2017, more than 68 million people were displaced from their homes, more than at any time since World War II. Our new policy aims to address this growing problem by, for example, making it possible for countries hosting large numbers of refugees to request additional support to immunise them. Bangladesh became the first country to take advantage of the policy, conducting Gavi-funded vaccination campaigns for Rohingya refugees in Cox's Bazar in late 2017.

Dr Ngozi Okonjo-Iweala assists with administering vaccinations at the Dongbang Health Centre, Lao People's Democratic Republic.

Gavi/2017/ Amanda Mustard

Collaboration is also key to ensuring the continued success of Gavi's sustainability model. Of the 16 countries that have transitioned out of Gavi support so far, 6 are showing signs of a downward trend in immunisation coverage. In order to keep immunisation levels high post-transition, we will continue our engagement with transitioning countries and – by working more closely with key partners such as the World Bank, the Global Fund and the Global Financing Facility around health financing and transition – provide them with the support they need to succeed.

This support also includes establishing mechanisms for peer-to-peer knowledge exchange such as South-to-South partnerships, in-person get-togethers, study tours and an online members' platform that encourages best practice in immunisation.

Initiatives such as these will continue to strengthen and broaden our collaborative links with key partners. Our collaborative work with the Global Fund, for example, already covers a wide range of immunisation related-activities, from risk management, advocacy and health system strengthening, through to monitoring and evaluation. Along with WHO and Unitaid, the Global Fund is also a major partner in our joint effort to pilot a new malaria vaccine. Large-scale trials are due to start in late 2018.

With positive impacts on education, global health security and civil registration, immunisation provides a gateway to universal health coverage. As our Alliance continues to play an increasingly central role in global health we expect to increase the level of collaboration with an ever-wider range of actors and partners as we work together towards our shared goals.

The Gavi model at work

Gavi, the Vaccine Alliance is a global partnership bringing together public and private sectors around the shared goal of creating equal access to vaccines for all children.

Inequity

19.9 million children worldwide miss out on a full course of basic vaccines. Over 80% of these children live in Gavi-supported countries.

Leveraging economies of scale

Responding to demand for vaccines and other immunisation products from the world's poorest countries, helping to drive down prices.

Long-term financing

Working with donors and countries to secure long-term, predictable funding for immunisation programmes:

- country co-financing of vaccines
- direct contributions from public- and private-sector donors
- diverse set of innovative finance mechanisms

Shaping markets

Creating healthy market dynamics. Ensuring sufficient supply of appropriate, innovative and affordable vaccines and cold chain equipment.

How the Vaccine Alliance works

Gavi, the Vaccine Alliance is a public-private partnership dedicated to creating equal access to vaccines for people in the world's poorest countries. We bring together all the main actors in global immunisation around our shared mission. All partners contribute to the Gavi business model, and all are accountable for its performance.

By leveraging economies of scale, Gavi is able to create more stable markets for vaccines and drive down vaccine prices. Sustained, low pricing for vaccines means that more countries are able to maintain and grow their immunisation programmes after our financial support stops.

All countries are required to co-finance a share of the cost of their Gavi-supported vaccines. As a country's income grows, its contributions gradually increase until it is in a position to cover the full cost of all its vaccines. This approach is unique in development aid.

Gavi's predictable, long-term funding base provides vaccine manufacturers, private-sector partners and implementing countries with the security they need to invest in immunisation. Manufacturers will invest in vaccine production if they are confident there is a market for their products, while countries, given the right support and backing, are encouraged to launch new immunisation programmes. Private-sector donors provide innovative solutions to help improve vaccine delivery systems.

Gavi's support for immunisation has helped countries to introduce vaccines against a range of life-threatening diseases. Support is also available for improving countries' health systems, helping them to extend the reach and coverage of immunisation programmes.

Higher immunisation coverage leads to healthier, more productive populations and greater prosperity. This, in turn, means countries are better able to pay for their own vaccine programmes and eventually transition out of our support.

Together we have already immunised more than 690 million children and saved over 10 million lives. We are on track to help developing countries to immunise 300 million children between 2016 and 2020 – averting 5–6 million future deaths.

While this is impressive, it does not end there. The impact of immunisation stretches far beyond preventing disease. Vaccinated, healthy children are more likely to be well-nourished, perform better at school and grow up to become productive adults.

Moreover, immunisation programmes put delivery and surveillance systems in place that benefit the entire health system, creating a solid platform for universal health coverage. They are essential in safeguarding against disease outbreaks and protecting global health security, making the world a safer place for everyone.

Accelerating access to vaccines

Supporting life-saving vaccines in routine immunisation programmes, campaigns and global stockpiles.

Strengthening vaccine delivery platforms

Creating a solid platform for immunisation and other health services, contributing to universal health coverage.

Sustaining immunisation

As countries become more prosperous, they invest more in their immunisation programmes. Populations become healthier and more productive.

Equity

Eventually, countries are able to fully finance their own immunisation programmes.

More children everywhere have access to more vaccines and enjoy improved health.

Transition out of financial support for vaccines
continued collaboration with Gavi

Continued support

A dynamic partnership

We multiply our impact by collaborating with all the key stakeholders in global health. Alliance partners work closely together at all levels – global, regional and national – through coordination teams, joint appraisal processes and interagency coordination committees, for example.

The partners' engagement framework (PEF) brings increased collaboration, transparency and accountability to our work and has led to an expansion of the Alliance. More than 60 partners now provide support to countries through PEF.

Our collaborative work with the Global Fund spans a wide range of areas, from risk management, advocacy and health system strengthening through to monitoring and evaluation. From June 2018, our two organisations' head offices are residing together in Geneva's new Health Campus.

Health workers in Aden, Yemen, during an oral cholera vaccination campaign
Lorenzo Pezzoli/WHO

Our support

Gavi provides three main types of support to recipient countries.

Vaccine support

The Vaccine Alliance currently supports 13 vaccines for use in routine immunisation programmes and preventive campaigns, as well as emergency stockpiles. By the end of 2017, we had helped 77 countries carry out nearly 400 vaccine introductions and campaigns and funded more than 90 million vaccine doses through global stockpiles.

Health system strengthening

Gavi supports countries in strengthening their health systems. Part of this support facilitates the introduction of more modern and environmentally-friendly cold chain equipment to make sure that vaccines can safely reach everyone who needs them. So far, we have provided health system strengthening grants to 69 countries.

Technical assistance

Through PEF, we channel resources to Alliance partners for technical support to countries, based on needs identified by the countries themselves. We give particular priority to the countries with the largest number of underimmunised children. The value of this type of support increased from US$ 52 million in 2016 to US$ 68 million in 2017.

Read more online
gavi.org/support

Balancing risk and reward to achieve our mission

Gavi operates in a dynamic and often uncertain context, and pursues an ambitious mission in some of the world's poorest and most fragile countries. This means that we are inevitably exposed to a wide range of risks that could potentially hamper our ability to achieve our mission and strategic goals. To make the most of high-reward opportunities, we may sometimes be required to deliberately take calculated risks to achieve maximum impact.

Typical risks in the countries we support include vaccine hesitancy (which reduces demand for vaccines); disease outbreaks, disasters or unrest (which can disrupt routine immunisation programmes); stock-outs and excessive wastage of vaccines; and misuse of our support.

In order to optimise our impact and appropriately balance risk and reward, we have put in place a comprehensive risk management approach. This helps us to systematically understand, acknowledge and anticipate what might happen before it actually does.

In 2017, we continued to strengthen this approach and to enhance our culture of risk awareness. To this end, the Gavi Board approved a risk appetite statement which defines the degree of risk the Alliance is willing to take, accept or tolerate to achieve its goals. This has driven strategic alignment across the Gavi Board and served to guide decision-makers in the Alliance in terms of appropriate risks required in order to deliver on our mission.

The top risks identified in 2016 have all been allocated to risk owners in the Secretariat, who are tasked with overseeing how the Alliance monitors and manages them. The 2017 risk & assurance report highlighted how these top risks had evolved and determined whether the risk exposures were acceptable based on the Board-approved risk appetite.

The report, published in November, showed that Gavi's overall risk profile had remained relatively stable between 2016 and 2017. However, it highlighted three risks that currently fall outside the Alliance's risk appetite: country management capacity, data quality and the ability to reach the un- and underimmunised. Mitigating these risks may require further investment and more ambitious tools and strategies.

Expanded Programme on Immunization (EPI) workers in a newly constructed, Gavi-funded vaccine warehouse in Lahore, Pakistan

Gavi/2017/Asad Zaidi

Risk appetite statement

Gavi's risk appetite statement, which was reviewed in 2017, aims to align Alliance partners and guide decision-makers in taking the right amount and types of risk to deliver on Gavi's mission.

Overall, the Alliance embraces the need to take programmatic risk given its ambitious mission and operating model. However, it has a lower appetite for organisational risks impacting Alliance processes, systems and management, as well as for those jeopardising fiduciary oversight and control, and brand and stakeholder confidence.

Read more online
gavi.org/about/programme-policies/risk-policy/

Measuring our performance

mission and strategic goals

Gavi/2011/Doune Porter

The Vaccine Alliance's 2016–2020 mission is to save children's lives and protect people's health by increasing equitable use of vaccines in lower-income countries.

To achieve our mission, we rely on a five-year strategy with five mission indicators, four strategic goals and a set of key performance indicators that help us track our progress.

Mission indicators

Five mission indicators reflect our overall aspiration for the 2016–2020 period. We aim to help countries to immunise 300 million children in this period, thereby saving 5–6 million lives in the long term. This is expected to contribute to a 10% reduction in child mortality rates in Gavi-supported countries, and avert 250 million years lost due to disability and death.

Sustainability is another important ambition for the Alliance. We strive to ensure that all recommended vaccine programmes are maintained by countries after our financial support stops.

Strategic goals

Gavi's strategic goals for the 2016–2020 period are:

- to accelerate equitable uptake and coverage of vaccines ("the vaccine goal");
- to increase the effectiveness and efficiency of immunisation delivery as an integrated part of strengthened health systems ("the health systems goal");
- to improve sustainability of national immunisation programmes ("the sustainability goal"); and
- to shape markets for vaccines and other immunisation products ("the market shaping goal").

Disease dashboard

Our goal is to reduce the overall disease burden in Gavi-supported countries. Therefore, we also track the proportion of countries with low prevalence of three vaccine-preventable diseases: hepatitis B, rotavirus diarrhoea and measles.

Read more online
gavi.org/about/strategy

Mission indicators

Vaccine Alliance partners and countries are making great strides towards the achievement of our five mission indicators. By the end of 2017, we were on track to reach all our 2020 mission targets.

Key:

- On track
- Moderate delays/challenges
- Significant delays/challenges
- No established target/data not available

1 Children immunised

2017: **65m**

127m

2015: **n/a** | 2020 target: **300m**

Sources: WHO/UNICEF Estimates of National Immunization Coverage; United Nations Population Division; World Population Prospects

What we measure

The number of children immunised with the last recommended dose of a Gavi-supported vaccine delivered through routine systems.[a] People immunised through campaigns and supplementary immunisation activities are not included.

2017 performance

Countries immunised 65 million children – often with more than one Gavi-supported vaccine – in 2017. This is 3 million more than in 2016 and brings the total number of children immunised with our support in the current strategic period to 127 million. We are on track to help countries immunise 300 million children between 2016 and 2020.

2 Future deaths prevented

2017: **1.3m**

2.5m

2015: **n/a** | 2020 target: **5–6m**

Source: Vaccine Impact Modelling Consortium

What we measure

The number of future deaths prevented as a result of vaccination with Gavi-funded vaccines in the countries we support.

2017 performance

Developing countries prevented approximately 1.3 million future deaths in 2017, up from 1.2 million in 2016, thanks to Gavi-supported vaccines. This puts us well on track to help countries to avert 5–6 million future deaths in the 2016–2020 period.

3 Under-five mortality rate

2016: **60/1,000** | 2017 data available: **Q4 2018**

2015: **62/1,000** | 2020 target: **56/1,000**

Sources: The United Nations Inter-agency Group for Child Mortality Estimation; United Nations Population Division; World Population Prospects

What we measure

The average probability of a child born in any of the Gavi-supported countries dying before they reach the age of five.

2017 performance

Under-five mortality fell from 62 to 60 deaths per 1,000 live births between 2015 and 2016, putting us on track to reach our target of 56 deaths per 1,000 live births by the end of 2020. 2017 estimates will be available in late 2018.

4 Future disability-adjusted life years averted

2017: **55m**

105m

2015: **n/a** | 2020 target: **250m**

Source: Vaccine Impact Modelling Consortium

What we measure

The number of future disability-adjusted life years (DALYs) averted as a result of vaccination with Gavi-supported vaccines. DALYs measure the number of healthy years lost due to disability or premature death.

2017 performance

Countries averted approximately 55 million DALYs in 2017 thanks to our support, compared with 50 million in 2016. We are on course to achieve our target of 250 million DALYs averted by 2020.

a – To ensure that we do not double-count children who receive more than one vaccine, we only take into account the Gavi-supported vaccine with the highest coverage level in each country.

5 Vaccines sustained after Gavi support ends

100%

2015: **n/a** | 2016–2020 target: **100%**

Source: WHO/UNICEF Estimates of National Immunization Coverage

What we measure

The percentage of countries that continue to deliver all recommended vaccines included in their routine programmes after they transition out of Gavi financing. This indicator covers all vaccines recommended by national authorities for routine immunisation, not only those supported by Gavi.

2017 performance

All transitioned countries continued to deliver all their recommended routine vaccination programmes throughout 2017.

Disease dashboard

Measles

50%

2015: **50%** | 2020 target: **n/a**

Source: WHO vaccine-preventable disease surveillance system

What we measure

The percentage of Gavi-supported countries reporting fewer than five measles cases per million people annually.

2017 performance

50% of Gavi-supported countries reported fewer than five measles cases per million people in 2017. The results suggest that the measles burden in Gavi-supported countries with available data has stayed virtually unchanged over the past three years.

Rotavirus

28%

2015: **24%** | 2020 target: **n/a**

Source: WHO rotavirus laboratory network

What we measure

The median proportion of acute gastroenteritis hospitalisations in children under one year in Gavi-supported countries testing positive for rotavirus.

2017 performance

The median proportion of acute gastroenteritis hospitalisations in children under one year testing positive for rotavirus was 28%. Less than half all Gavi-supported countries were included in the 2017 reporting. Available data from these countries suggests that the burden has largely remained constant since 2015.

Hepatitis B

n/a

2015: **83%** | 2020 target: **n/a**

Source: WHO regional hepatitis B control initiatives and other surveys

What we measure

The percentage of Gavi-supported countries with low prevalence of hepatitis in children under five.

2017 performance

No hepatitis B prevalence surveys have been conducted in Gavi-supported countries since 2015.

Strategic goal indicators

We measure progress towards our 2016–2020 strategic goals through a set of objectives and indicators. This page gives a quick overview of our performance to date.

More information about each indicator and Gavi's achievements in 2017 is available in the strategic goal chapters.

Key:

- On track
- Moderate delays/challenges
- Significant delays/challenges
- No established target/data not available

Accelerate vaccines

Routine immunisation coverage

Percentage of children in Gavi-supported countries that have received:

3rd dose of pentavalent vaccine

80%

2015: **79%** 2020 target: **84%**

1st dose of measles-containing vaccine

78%

2015: **78%** 2020 target: **83%**

Breadth of protection

Average coverage across all Gavi-supported vaccines

41%

2015: **30%** 2020 target: **62%**

Equity: geographic distribution[a]

Percentage of districts in Gavi-supported countries with at least 80% pentavalent vaccine coverage

84%

2015: **79%** 2020 target: **89%**

Equity: wealth distribution[a]

Average difference in pentavalent vaccine coverage between the richest and poorest quintiles

19%

2015: **19%** 2020 target: **16%**

Equity: maternal education[a]

Average difference in pentavalent vaccine coverage between children of educated and non-educated mothers

19%

2015: **19%** 2020 target: **15%**

Vaccine goal p13

Strengthen capacity

Supply chain performance[b]

Average score achieved by Gavi-supported countries in WHO's effective vaccine management assessment, which measures supply chain performance

68%

2015: **67%** 2020 target: **TBD**

Data quality

Percentage of countries meeting our benchmark for quality of immunisation coverage data

47%

2015: **45%** 2020 target: **53%**

1st dose pentavalent vaccine coverage & drop-out rate between 1st & 3rd dose

86%

2015: **86%** 2020 target: **90%**

8% 7% 5%

Integrated health service delivery

Percentage of countries meeting the benchmark for integrated service delivery

44%

2015: **32%** 2020 target: **42%**

Civil society engagement

Percentage of countries meeting the benchmark for civil society engagement

57%

2015: **n/a** 2020 target: **TBD**

Health systems goal p21

Improve sustainability

Countries on track to successful transition

Percentage of transitioning countries that are on track to do so successfully

53%

2015: **63%** 2020 target: **75%**

Co-financing

Percentage of countries with a co-financing obligation to Gavi that meet their commitments

100%

2015: **85%** 2020 target: **100%**

Country investments in routine immunisation

Percentage of Gavi-supported countries that have increased their investment in routine immunisation per child relative to 2015

2016: 54% 2017 data available: Q4 2018

2015: **n/a** 2020 target: **100%**

Institutional capacity[b]

The average composite score in institutional capacity in Gavi-supported countries

2.4

2015: **n/a** 2020 target: **TBD**

Sustainability goal p27

Shape markets

Sufficient and uninterrupted supply

Number of Gavi vaccine markets where supply meets demand

8

2015: **7** 2020 target: **11**

Vaccine price reduction

Weighted average price of fully immunising a child with pentavalent, pneumococcal and rotavirus vaccines

US$ 17

2015: **US$ 20** 2020 target: **not published**

Innovation

Number of vaccines and immunisation products with improved characteristics procured by Gavi

5

2015: **0** 2020 target: **10**

Healthy market dynamics

Number of vaccine markets classified as having moderate or high healthy market dynamics

3

2015: **1** 2020 target: **6**

Market shaping goal p31

a – Indicator revised in early 2018, as part of a broader revision of a set of indicators agreed by the Gavi Board in 2017.

b – Indicator revised in early 2018, as part of a broader revision of a set of indicators agreed by the Gavi Board in 2017. The new target is pending approval by the Board at the end of 2018.

Note: the source for each indicator is given in the respective strategic goal chapter.

Gavi-supported countries: at a glance

Overview of key country data, from immunisation coverage and child mortality rates to Gavi-funded vaccine programmes and transition status.

Country	Surviving infants (surviving to 1 year (2017))	Child mortality rate (deaths <5 years per 1,000 births (2016))	Immunisation coverage (DTP3/pentavalent 3rd dose) (2017)	Gavi-supported vaccine introductions (2017) (R = routine, C = campaign, D = demonstration project)	Previous (2000–2016)	Gross national income[a] per capita, US$ (2015)	Transition status (2017) (see note below)
African region							
Angola	1,160,571	83	52%	IPV R	Pentavalent R; Rotavirus R; Pneumococcal R	4,180	
Benin	384,570	98	82%		Pentavalent R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Yellow fever C; Meningitis A RC	860	
Burkina Faso	698,049	85	91%	MenA R	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Measles R; Measles-rubella C; Meningitis A C; Yellow fever C	660	
Burundi	423,451	72	91%	MR C	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles R	260	
Cameroon	810,406	80	86%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles-rubella C; Meningitis A C; Yellow fever RC	1,330	
Central African Republic	152,546	124	47%	MenA R; MenA C	Pentavalent R; Pneumococcal R; Human papillomavirus R; Yellow fever RC	320	
Chad	586,494	127	41%	MenA R	Pentavalent R; Human papillomavirus R; Measles C; Measles-rubella C; Meningitis A R	880	
Comoros	24,941	73	91%		Pentavalent R; Human papillomavirus R	790[b,f]	
Congo, DR	3,177,168	94	81%		Pentavalent R; Pneumococcal R; Human papillomavirus R; Measles C; Measles-rubella C; Meningitis A R	410	
Congo	172,508	54	69%		Pentavalent R; Rotavirus R; Pneumococcal R; Human papillomavirus R; Meningitis A R	2,540	
Côte d'Ivoire	836,856	92	84%	Rota R	Pentavalent R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles-rubella C; Meningitis A C	1,410	
Eritrea	154,812	45	95%		Pentavalent R; Rotavirus R; Pneumococcal R; Measles R	Low	
Ethiopia	3,160,680	58	73%	Meas C	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles C; Measles-rubella C	590	
Gambia	78,243	65	92%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles R; Measles-rubella C; Meningitis A C	460[b,f]	
Ghana	844,106	59	99%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Measles R; Measles-rubella C; Meningitis A RC; Yellow fever RC	1,480	
Guinea	428,512	89	45%		Pentavalent R; Human papillomavirus R; Meningitis A C; Yellow fever RC	470	
Guinea-Bissau	62,251	88	87%		Pentavalent R; Rotavirus R; Pneumococcal R; Human papillomavirus R; Meningitis A C; Yellow fever R	590	
Kenya	1,483,186	49	82%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles-rubella C; Yellow fever R	1.340	
Lesotho	58,390	94	93%	MR C; Rota R	Pentavalent R; Pneumococcal R; Human papillomavirus R	1,330[b,f]	
Liberia	153,410	67	86%	IPV R	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Yellow fever RC	380	
Madagascar	817,783	46	74%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R	420	
Malawi	639,280	55	88%	MR C	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Measles R	350	
Mali	730,060	111	66%	MenA R; MenA C	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Meningitis A C; Yellow fever RC	790	
Mauritania	139,576	81	81%		Pentavalent R; Rotavirus R; Pneumococcal R; Human papillomavirus R; Meningitis A C	1,370[b,f]	
Mozambique	1,072,931	71	80%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles R	580	
Niger	971,554	91	81%	MenA R	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Meningitis A C; Yellow fever R	390	
Nigeria	6,862,604	104	42%	Meas C	Pentavalent R; Pneumococcal R; Human papillomavirus R; Measles C; Measles-rubella C; Yellow fever RC	2.820	
Rwanda	358,010	39	98%	MR C	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus R; Measles R; Measles-rubella C	700	
São Tomé and Príncipe	6,538	34	95%	HPV D	Pentavalent R; Rotavirus R; Pneumococcal R; Human papillomavirus R; Measles R; Measles-rubella C; Yellow fever R	1,670[b,f]	
Senegal	534,930	47	93%	MR C	Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Human papillomavirus R; Measles R; Measles-rubella C; Meningitis A C; Yellow fever C	1000	
Sierra Leone	239,658	114	90%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Measles R; Yellow fever RC	630	
South Sudan	417,397	91	26%		Pentavalent R; Human papillomavirus R; Meningitis A C	790	
Togo	248,619	76	90%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Meningitis A C; Yellow fever RC	540	
Uganda	1,690,885	53	85%	MenA C	Pentavalent R; Pneumococcal R; Rotavirus R; Human papillomavirus R	670	
Tanzania, UR	2,082,676	57	97%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Measles-rubella R; Meningitis A C	910[c,f]	
Zambia	617,693	63	94%		Pentavalent R; Rotavirus R; Pneumococcal R; Measles-rubella R; Meningitis A C	1,490	
Zimbabwe	511,497	56	89%		Pentavalent R; Rotavirus R; Pneumococcal R; Rotavirus D; Yellow fever RC	850	

Transition status: 1 – Initial self-financing; 2 – Preparatory transition; 3 – Accelerated transition; 4 – Fully self-financing

a – GNI for 2015 in US$, Atlas method, unless otherwise indicated.
b – 2015 data not available; figure is approximate.
c – Covers mainland United Republic of Tanzania only.
d – Excludes Abkhazia and South Ossetia.
e – Excludes Transnistria.
f – These figures are for 2014 or 2013.

Low = Estimated to be low-income (GNI US$ 1,025 or less).
Up/Mi = Estimated to be upper-middle-income (GNI US$ 4,036–12,475).

Sources: Gavi, the Vaccine Alliance; UNDP; WHO/UNICEF Estimates of National Immunization Coverage; World Bank; World Development Indicators database.

Read more online
gavi.org/country

Country	Surviving infants (surviving to 1 year (2017))	Child mortality rate (deaths <5 years per 1,000 births (2016))	Immunisation coverage (DTP3/pentavalent 3rd dose) (2017)	Gavi-supported vaccine introductions (2017) (R = routine, C = campaign, D = demonstration project)	Previous (2000–2016)	Pentavalent	Rotavirus	Pneumococcal	Human papillomavirus	Inactivated polio	Japanese encephalitis	Measles	Measles-rubella	Meningitis A	Yellow fever	Gross national income* (per capita, US$ (2015))	Transition status (2017) (see note below)
Region of the Americas																	
Bolivia	244,950	37	84%	HPV R			R	R		R						3,080	
Cuba	122,721	6	99%							R						Up/Mi	
Guyana	15,347	32	97%	HPV R			R	R		R						4,090	
Haiti	250,474	67	60%		R	R				R						820	
Honduras	193,798	19	97%			R	R	R		R						2,270	
Nicaragua	116,796	20	98%			R	R			R						1,940	
Eastern Mediterranean region																	
Afghanistan	1,090,847	70	65%		R		R			R		C				630	
Djibouti	20,573	64	68%		R	R	R			R						Low	
Pakistan	5,102,781	79	75%	Rota R	R		R			R		C				1,440	
Somalia	591,951	133	42%		R					R						Low	
Sudan	1,263,137	65	95%		R	R	R			R				RC	C	1,840	
Yemen	839,084	55	68%		R	R	R			R			C			1,300[b,f]	
European region																	
Armenia	37,820	13	94%	HPV D	R	R	R			R						3,880	
Azerbaijan	163,712	31	95%		R		R			R						6,560	
Georgia	51,446	11	91%	HPV D	R	R	R									4,160[d,f]	
Kyrgyzstan	145,597	21	92%		R		R									1,170	
Republic of Moldova	40,362	16	88%	HPV D	R	R	R									2,220[e,f]	
Tajikistan	243,358	43	96%		R	R										1,240	
Uzbekistan	635,229	24	99%		R	R	R									2,150	
South-East Asian region																	
Bangladesh	2,982,976	34	97%		R		R	D	R		R	C				1,190	
Bhutan	14,084	32	98%		R				R							2,370	
Korea, DPR	346,636	20	97%		R				R		R					Low	
India	24,280,341	43	88%	Pneu R MR C	R	R			R							1,590	
Indonesia	4,806,445	26	79%	HPV D MR C	R				R							3,440	
Myanmar	900,918	51	89%	JE C	R		R		R		R	C				1,280[b,f]	
Nepal	556,336	35	90%		R		R	D	R	RC	R	R				730	
Sri Lanka	310,936	9	99%	HPV R	R				R							3,800	
Timor-Leste	43,310	50	76%		R				R							1,920	
Western Pacific region																	
Cambodia	357,932	31	93%	HPV D MR C	R		R		R	C	R	C				1,070	
Kiribati	3,105	54	90%		R		R		R							3,230	
Lao PDR	154,187	64	85%	MR R	R		R	D	R	C		R				1,730	
Mongolia	69,383	18	99%		R		R									3,830	
Papua New Guinea	215,204	54	62%		R		R		R			RC				2,240[b,f]	
Solomon Islands	16,812	26	94%		R		R	D	R			C				1,940	
Vietnam	1,543,906	22	94%		R						R	C				1,980	

Transition status
1 – Initial self-financing
2 – Preparatory transition
3 – Accelerated transition
4 – Fully self-financing

Note: as Gavi only supports oral cholera and multivalent meningitis vaccines through global stockpiles, these are not included among the country introductions. Gavi only opened its support window for typhoid vaccine at the end of 2017, with the first introductions expected in 2019.

Strategic enablers

In addition to the strategic goals, our strategy for 2016–2020 has four strategic enablers, which are critical to the success of our mission.

Country leadership, management and coordination

Together with our partners, we support countries in strengthening the leadership, management and coordination of their national immunisation programmes. This typically involves bolstering the institutional capacity for programme management and monitoring, as well as helping countries improve the availability, quality and use of data to inform their decision-making.

Resource mobilisation

Our resource mobilisation model is multi-faceted, relying on a mix of country co-financing and other domestic investments in immunisation, long-term donor funding and active market shaping efforts. Harnessing the capacity of the private sector, both in the form of financial contributions and through technical assistance, is a fundamental part of our model. We also draw on a range of innovative finance instruments to support our programmes.

Advocacy

Political commitment at the global, national and subnational level is essential if we are to improve immunisation coverage and equity. Together with our partners, we work to ensure that the value of vaccines is recognised and that immunisation remains a priority at all levels. Raising awareness of the links between immunisation, good health and economic prosperity is an important part of our advocacy efforts.

Monitoring and evaluation

Our monitoring and evaluation systems help to make sure that our support delivers the expected results and that we are using our resources effectively. They also highlight potential problems and allow us to adjust our approach if necessary. In addition to conducting regular evaluations of our investments, we work with partners to strengthen in-country surveillance, programme monitoring and management functions.

Read more about Gavi's support for strengthening in-country leadership, management and coordination

p26

Gavi/2018/Karel Prinsloo

Find out more about our resource mobilisation activities in 2017

p35

Gavi/2017/Iryna Mazur – Isaac Griberg

Read about our collaboration with civil society to advocate for immunisation

p25

Gavi/2017/Asad Zaidi

Learn about Gavi's strategic focus area for data

p24

Gavi/2007/Mithra Weerakone

Gavi/2017/Thierry Vincent

The vaccine goal

accelerate equitable uptake and coverage of vaccines

2017 at a glance:

- **Average coverage of Gavi-funded vaccines in the countries we support climbed to 41%, up from 37% in 2016.**
- **Coverage with a full course of pentavalent vaccine across Gavi-supported countries has stalled at 80% – some way from our 2020 target of 84%.**
- **On average, 84% of districts across Gavi-supported countries met the benchmark for equitable immunisation coverage, putting us on track to achieve our target.**
- **We only achieved 35 of the 50 introductions scheduled to take place in 2017, largely due to supply shortages.**
- **2017 saw the WHO prequalification of a new, more effective typhoid vaccine, allowing Gavi to open a funding window to support it.**

Reaching the unreached

All children – regardless of whether they are girls or boys, where they live or how poor they are – are entitled to be vaccinated against deadly and debilitating diseases. To help ensure that children everywhere have access to this fundamental right to health, our Alliance continues to support the delivery of 13 life-saving vaccines in the world's poorest countries, including some of the most fragile.

Since Gavi was founded in 2000, we have supported nearly 400 vaccine introductions and campaigns and helped to increase average routine immunisation coverage rates by more than 20 percentage points across the countries we support.

However, this average figure masks inequities in coverage between countries. In non-fragile Gavi-supported countries, coverage has steadily increased, putting it on a par with the global average. Meanwhile, coverage across the 18 Gavi-supported countries that were classified as fragile in 2017 has remained flat over the past seven years.

This is not to say that no progress has been made: given population growth and the enormous challenges fragile countries face, maintaining coverage levels is already an impressive achievement. But we recognise that we need to work harder to overcome the obstacles to reaching every child in all countries – poor infrastructure, lack of frontline health workers, weak management and social, cultural and gender-related barriers – in order to achieve our goals.

Our objectives

Our ambitions for the 2016–2020 period include not only extending the reach of routine immunisation programmes but also increasing the number of vaccines each child receives. On the latter, we are progressing well.

Despite some delays due to supply shortages, between January 2016 and December 2017 we supported 80 introductions and campaigns; at least 150 more are expected by the end of 2020.

In recent years, an increasing proportion of our support has been allocated to immunisation campaigns. While these are essential in order to vaccinate those who are missing out on routine immunisations, there is a risk that frequent and insufficiently planned campaigns take much-needed resources away from routine programmes. We are working with countries to improve the quality of campaigns through more careful planning and systematic assessments to ensure that the expansion and strengthening of routine immunisation programmes is not compromised.

While increasing coverage and equitable uptake of all vaccines across the countries we support remains our key objective, we also aim to:

- support countries to introduce and scale up vaccines against new and important diseases; and
- respond flexibly to meet the particular needs of children in fragile countries.

Our vaccine portfolio

Vaccine	Purpose	Gavi supports	Introductions and campaigns 2017	Introductions and campaigns from programme start to 2017	Total reached from programme start to 2017
Pentavalent vaccine	Protects against five major infections in one shot: diphtheria, tetanus, pertussis (whooping cough), hepatitis B and *Haemophilus influenzae* type b (Hib).	**Routine immunisation**	0	73[a]	>404m
Pneumococcal vaccine	Helps prevent the primary cause of bacterial pneumonia, a leading cause of vaccine-preventable deaths among under-fives.	**Routine immunisation**	1	58	>143m
Rotavirus vaccine	Protects against a leading cause of severe diarrhoea, which kills hundreds of thousands of children each year.	**Routine immunisation**	3	43	>76m
Human papillomavirus (HPV) vaccine	Protects against the main cause of cervical cancer. Vaccination is vital in poor countries where access to cancer screening and treatment is limited.	**Routine immunisation** **Demonstration projects**	3 6	6 30	1.5m girls
Inactivated polio vaccine (IPV)	Protects against a highly contagious viral infection, mainly affecting children under the age of five, which can lead to paralysis or even death.	**Routine immunisation**	2	55	>75m
Japanese encephalitis vaccine	Prevents the main cause of viral encephalitis, especially in Asia. Case–fatality rates can be as high as 30%, while up to 50% of survivors suffer permanent disability.	**Routine immunisation** **Catch-up campaigns** For children aged 9 months to 14 years, on the condition that countries subsequently co-finance the introduction of the vaccine into the routine system.	1 1	4 4	>919,000 >17m
Measles and measles-rubella vaccines	Measles vaccine helps prevent against measles infection and associated complications, which claimed close to 90,000 lives in 2016. Rubella vaccine protects against congenital rubella syndrome. Every year, 100,000 children are born with malformations and disabilities caused by the disease – the vast majority in Gavi-supported countries.	**Routine immunisation** Measles-rubella (MR) second dose MR first dose **Campaigns** Measles follow-up[b] MR mass, catch-up[c] and follow-up **Outbreak response fund** Managed by the Measles & Rubella Initiative	 0 1 2 8 >9m	 19 18 11 26 ~50m	 >52m >15m >159m >211m
Meningitis A vaccine	Protects against seasonal epidemics of meningitis A, which threatens 450 million people in Africa's meningitis belt. Survivors can face brain damage, deafness and other disabilities.	**Routine immunisation** **Campaigns** Mass Catch-up	5 2 1	7 21 4	>3m >279m
Meningitis vaccine stockpile	Protects against a variety of meningococcal strains (A, C, W and Y) that continue to cause outbreaks across parts of Africa and elsewhere in the world.	**Stockpile**	accessed 10x by 4 countries	accessed 48x by 13 countries	>21m doses distributed
Oral cholera vaccine stockpile	Prevents cholera, an acute intestinal infection caused by contaminated food or water. It can lead to severe dehydration and, in its extreme form, can be fatal.	**Stockpile**	accessed 18x by 9 countries	accessed 52x by 18 countries	>18m doses distributed
Yellow fever vaccine	Helps prevent a deadly viral disease spread by mosquitoes. Death rates can be as high as 50% among those severely affected.	**Routine immunisation** **Mass campaigns**	0 0	17 14	>107m >98m
Yellow fever vaccine stockpile		**Stockpile**	accessed 4x by 2 countries	accessed 53x by 20 countries	>52m doses distributed

Read more online
gavi.org/support/nvs

a – Five of the 73 countries introduced the pentavalent vaccine independently of Gavi support.

b – Nationwide follow-up campaigns target children aged 9–59 months every 2–4 years.

c – Initial, nationwide catch-up campaigns target all children aged 9 months to 14 years.

A closer look at 2017:

The performance indicators: vaccine coverage

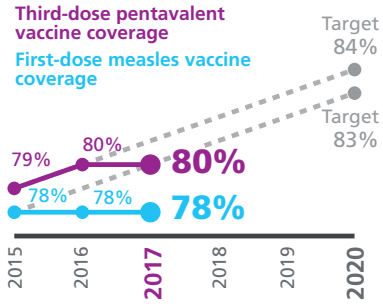
1 Routine immunisation coverage

What we measure: percentage of children reached with the third dose of pentavalent vaccine, which protects against diphtheria, tetanus, pertussis (DTP), hepatitis B and Hib, and the first dose of measles vaccine in Gavi-supported countries. Pentavalent vaccine is given in three doses, all within the first six months of a child's life. Children receive the first dose of a measles-containing vaccine before their first birthday.

Universally present in the routine schedules of Gavi-supported countries, coverage estimates for these two vaccines provide a reliable indicator of the proportion of children with access to basic immunisation services.

2017 performance: average coverage of the first dose of measles vaccine in Gavi-supported countries has plateaued at 78%. While third-dose pentavalent vaccine coverage increased between 2015 and 2016, it stalled over the past year – leaving us moderately off track to reach our 2020 target. This trend is particularly evident in fragile countries, where coverage has remained at just 62% since 2010.

Because of population growth, flatlining coverage rates still mean that countries are immunising more children than ever before. The total number of children who received a third dose of DTP-containing vaccine, such as pentavalent, in Gavi-supported countries increased from 62 million in 2016 to close to 64 million in 2017.



Source: WHO/UNICEF Estimates of National Immunization Coverage

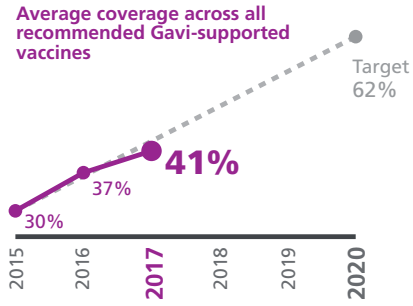
2 Breadth of protection

What we measure: percentage of children reached with the last dose of seven vaccines recommended across all Gavi-supported countries and the last dose of three vaccines specific to certain regions.[a]

a – In 2017, this indicator only tracked six vaccines. HPV vaccine was not included due to lack of data.

2017 performance: coverage for these nine vaccines averaged 41% in 2017, an increase of 4 percentage points compared with 2016. However, progress was below target in 2017 – largely due to delayed vaccine introductions caused by supply shortages – and we are slightly off track to reach our 2020 target of 62%.

Sources: WHO/UNICEF Estimates of National Immunization Coverage; WHO/UNICEF Joint Reporting Form



Fighting the biggest child killer diseases

Pneumonia and diarrhoea are the two leading causes of death among children under five worldwide. Pneumococcal vaccines protect against the most common bacterial causes of pneumonia, while rotavirus vaccine safeguards against the most deadly cause of diarrhoea in young children. Together, these two vaccines can help to prevent millions of deaths in the world's poorest countries.

Rotavirus vaccine

Three new launches in 2017 brought the total number of Gavi-supported rotavirus vaccine introductions to 43. The introduction in Pakistan's Punjab province in January reached 20% of the national population, paving the way for the planned roll-out across all provinces in 2018. Another six countries – Afghanistan, Benin, Kyrgyzstan, Lao People's Democratic Republic, Nepal and the Solomon Islands – were approved for rotavirus vaccine support. However, short-term supply constraints resulted in three introductions being delayed, either entirely or partially, in 2017.

Nevertheless, coverage of a full course of the vaccine across Gavi-supported countries increased by 5 percentage points between 2016 and 2017 to reach 28%.

Pneumococcal vaccine

By December 2017, the vast majority of Gavi-supported countries, 58, had introduced pneumococcal vaccine with our funding. India's pneumococcal vaccine introduction, starting in Bihar, Himachal Pradesh and Uttar Pradesh in May 2017, represents an important step towards reducing global pneumonia deaths among children, 20% of which occur in India. It is estimated that the vaccine reached more than two million Indian children in 2017 alone.

2017 saw only a modest increase in pneumococcal vaccine coverage rates, which now average 43% in Gavi-supported countries. However, this still means that coverage in these countries remains almost on a par with the global average of 44%.

Administering the rotavirus vaccine at a rural health centre
Gavi/2017/Asad Zaidi

Preventing cancer with vaccines

Most people are aware of the role of vaccines in preventing infectious disease, but many do not realise that they can also protect against some cancers that are caused by infections. We support two cancer vaccines, the HPV vaccine which protects against cervical cancer, and the hepatitis B vaccine which prevents liver cancer – the second most lethal type of cancer among men after lung cancer. According to WHO, vaccination against hepatitis B and HPV can prevent over 1 million cancer cases every year.

Human papillomavirus vaccine

Gavi started supporting the HPV vaccine in 2012, in a bid to reduce the high burden of cervical cancer deaths in developing countries where women often lack access to screening and treatment. The vaccine can prevent up to 90% of all cervical cancer cases.

By the end of 2017, 30 Gavi-supported countries had completed HPV vaccine demonstration programmes. Three countries added the vaccine to their national immunisation programme during the year, bringing the total to six.

So far, 1.5 million girls have been immunised against HPV infection with our support. Gavi launched a new HPV programme in 2016, designed to increase the vaccine's impact and uptake through immunisation of multi-age cohorts (9–14 years). However, the new programme – and the surge in country demand that followed its launch – was met with supply challenges and, subsequently, delayed introductions. We are working closely with vaccine manufacturers and other Alliance partners to improve the health of the HPV vaccine market and secure sufficient supply to meet future demand.

In the meantime, to ensure that as few girls as possible miss out on the opportunity to be vaccinated, we have adjusted the HPV programme to allow countries to introduce the vaccine for one single age group, or "cohort", until supply becomes sufficient to cater for all cohorts.

See also HPV vaccine market **p34**

Hepatitis B vaccine

Hepatitis B vaccine is part of the five-in-one pentavalent vaccine, which also protects against diphtheria, tetanus, pertussis (whooping cough) and *Haemophilus influenzae* type b (Hib). Pentavalent vaccine has been introduced in all Gavi-supported countries, with the average coverage of a full course of the vaccine reaching 80% in 2017.

India sets ambitious vaccination goals

India's Prime Minister, Narendra Modi, has announced his country's ambition to increase the proportion of fully immunised children from 62% in 2014 to 90% by the end of 2018, with the help of the intensified *Mission Indradhanush* programme. India's basic immunisation coverage has climbed steadily over the last decade, with an increase of 24 percentage points since 2007.

India started to roll out pneumococcal vaccine in three states – Bihar, Himachal Pradesh and Uttar Pradesh – in May 2017. Both Bihar and Uttar Pradesh are known for having the highest burden of under-five pneumonia deaths in the country. This important step will pay off in several ways: a recent report showed that the pneumococcal vaccine, along with the rotavirus vaccine which was introduced in 2016, could avert more than 90,000 child deaths and generate over US$ 1 billion in economic benefits every year.

In another bold effort to protect its children, India launched the world's largest, most ambitious vaccination campaign against measles-rubella, and followed this up by introducing the vaccine into its routine immunisation schedule. India is aiming to vaccinate 405 million children over two years with the combined measles-rubella vaccine.

Despite its progress, India faces complex challenges in its efforts to improve the coverage, equity and sustainability of its routine immunisation programme. Reported improvements in national coverage may mask large inequities both within and between states. Strengthening routine systems, by making use of innovations in both vaccine and cold chain technologies, will be essential if India is to achieve its goals and protect all of its children with life-saving vaccines.

Father and daughter in the district of Bareilly, India
Gavi/2014/Oscar Seykens

Forward planning: Gavi's vaccine investment strategy

Developed every five years, the vaccine investment strategy (VIS) is Gavi's evidence-based process for prioritising investments into new vaccines. The VIS allows us to understand the various options for future investments and how well they fit into the current vaccine portfolio, including trade-offs and opportunities for synergies. It also gives partners, manufacturers and Gavi-supported countries the information they need to plan ahead.

During 2017, we worked with our partners to identify 21 candidate vaccines and other immunisation products for potential inclusion in the next VIS. The VIS will be reviewed by the Board at the end of 2018 and will, in addition to our current portfolio, cover our 2021–2025 strategic period.

The vaccines considered represent an increase in both the number and diversity of products compared with the previous VIS, which was developed in 2013. This reflects how our portfolio has evolved from an initial focus on universal introductions of routine vaccines to a broader approach to outbreak response, opportunities for learning and vaccines of regional importance.

Candidate vaccines being considered for potential investment include cholera and multivalent meningococcal vaccines for preventive immunisation; diphtheria, tetanus and pertussis-containing boosters; hepatitis B birth dose; rabies pre-exposure prophylaxis and respiratory syncytial virus vaccine, as well as IPV support beyond 2020.

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Read more online
gavi.org/about/strategy/vaccine-investment-strategy

A closer look at 2017:

The performance indicators: equity in vaccine coverage

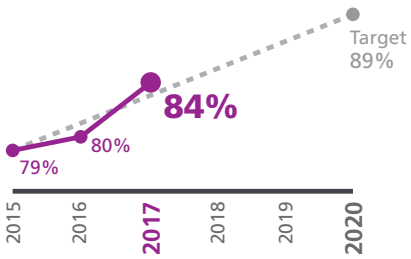
3 Geographic distribution

What we measure: average percentage of districts across the countries we support in which coverage with a third dose of pentavalent vaccine is equal to or greater than 80%. As part of an increased effort to ensure accurate subnational data is available for measuring equity, WHO and UNICEF have started to report geographically disaggregated coverage data on an annual basis.

2017 performance: the proportion of districts in Gavi-supported countries in which third-dose pentavalent vaccine coverage is equal to or above 80% increased from 80% in 2016 to 84% in 2017. We are on track to achieve our 2020 target of 89%.

Sources: WHO/UNICEF Estimates of National Immunization Coverage; WHO/UNICEF Joint Reporting Form

Equity: geographic distribution



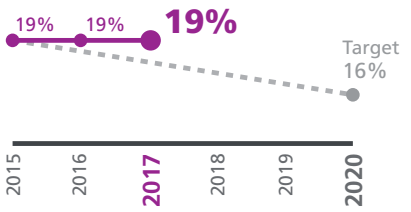
4 Wealth distribution

What we measure: average difference in coverage with a third dose of pentavalent vaccine between the poorest fifth of the population and the richest 20% across the Gavi-supported countries where recent data is available.

2017 performance: the average difference between immunisation coverage in the richest and poorest quintiles in Gavi-supported countries was 19% in 2017. The lack of movement on this indicator since 2015 means that we are not on track to reach our 2020 target of 16%. Due to the low availability of recent data, however, measuring progress in this area remains a challenge.

Sources: Latest available household surveys, such as demographic health surveys and multiple indicator cluster surveys

Equity: wealth distribution



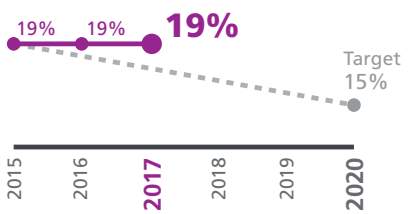
5 Maternal education

What we measure: average difference in coverage between children of non-educated mothers or other female caregivers, and those whose mothers have at least completed secondary school. We use three doses of pentavalent vaccine as the basis for this indicator, which includes all Gavi-supported countries where recent survey data is available.

2017 performance: the average difference between coverage of the third dose of pentavalent vaccine among children of educated and non-educated mothers in Gavi-supported countries has stalled at 19% over the last few years. Gavi is currently not on course to meet its 2020 target for this indicator, although the lack of availability of recent data poses challenges for accurately tracking this indicator.

Sources: Latest available household surveys, such as demographic health surveys and multiple indicator cluster surveys

Equity: maternal education



Collaborating to boost coverage and equity

See also PEF **p22,** fragility **p43**

The Alliance recognises the need to develop new ways of working together to reach those who are still missing out on life-saving vaccines. We have put in place a range of new tools, approaches and policies that allow us to better identify and address bottlenecks to improved immunisation coverage and equity.

The partners' engagement framework (PEF), which puts national needs and priorities in the driving seat with regards to technical assistance from Alliance partners, is one such tool. After just two years of operation, PEF has provided funding for more than 200 WHO and UNICEF country office staff dedicated to immunisation. This dramatically improves our ability to provide countries with technical support matched to their specific needs. Countries are increasingly drawing on the skills of non-traditional, or "expanded", partners for technical assistance. By the end of 2017, we had contracts with 42 such expanded partners, compared with just 24 at the end of 2016. Joint appraisals are another key tool in ensuring robust country-level dialogue on how to resolve barriers to improving immunisation coverage and equity.

We are continuing to tailor our support to respond to the specific challenges faced by fragile countries. Our new policy on fragility, emergencies and refugees, approved in June 2017, allows us to respond more quickly and flexibly to the needs of fragile countries. For instance, the policy allows countries hosting large numbers of refugees to request additional support to immunise them, and fragile countries to apply for vaccines that are outside of Gavi's traditional portfolio. It also enables us to work more directly with partners and civil society organisations operating in affected areas.

Towards the end of 2017 we started working with Nigeria – home to 25% of all underimmunised children in Gavi-supported countries – on a specific strategy for our collaboration. This will include mapping areas of low coverage and identifying new ways to find and immunise the children who are still missing out.

Working together to prevent disease outbreaks

With a total of nearly 100 in 2017 alone, disease outbreaks continue to feature highly on the global agenda. While all epidemics are devastating, outbreaks of vaccine-preventable diseases are entirely avoidable and their continuing presence is often a sign of underlying weaknesses in national immunisation programmes.

Several factors increase the risk of disease outbreaks, including large-scale population movements and climate change. Climate change is changing the profile of not only mosquito-borne diseases such as malaria, yellow fever and dengue but also that of diarrhoeal diseases and respiratory illnesses. WHO estimates that by 2030 rising temperatures will lead to 60,000 more deaths from malaria and 48,000 additional deaths due to diarrhoea every year.

Upwards trends in urbanisation and antimicrobial resistance (AMR) also increase the likelihood of disease outbreaks. AMR is currently responsible for some 700,000 deaths every year, a figure that is projected to rise to 10 million by 2050. Because vaccines have the potential to protect people against bacterial infection and so avoid the need for antibiotics, they are important tools in reducing the transmission of antibiotic-resistant disease strains.

The vast majority of the world's poorest and most vulnerable countries do not have the capacity to detect and respond to disease outbreaks as and when they strike. We are therefore actively working with developing countries to help them prevent and control outbreaks through a combination of improved routine immunisation programmes, preventive campaigns and emergency stockpiles.

We also work with a range of partners to foster a more integrated approach to preventing disease outbreaks through initiatives such as the Global Task Force for Cholera Control, WHO's Eliminate Yellow Fever (EYE) strategy, the Measles & Rubella Initiative and the Global Polio Eradication Initiative (GPEI).

See also Fragility **p43–45**

Support for emergency stockpiles

Gavi funds three emergency vaccine stockpiles: cholera, meningitis and yellow fever. These stockpiles are managed by the International Coordination Group, which brings together four organisations: the International Federation of the Red Cross and Red Crescent Societies, Médécins Sans Frontières, UNICEF and WHO. Gavi has also committed to funding an Ebola vaccine stockpile once a vaccine has been licensed and recommended by WHO. Thanks to a ground-breaking agreement between Gavi and Merck in 2016, investigational Ebola vaccine doses are available to combat outbreaks while the vaccine goes through the licensing process.

In the event of an outbreak, Gavi-supported countries can request vaccines from the stockpiles free of charge. Other countries can access Gavi-funded stockpile vaccines, but are required to reimburse the cost of the vaccines once the outbreak has come to an end. Financial support is also available to help with the planning and implementation of emergency vaccination campaigns.

Yellow fever

Several outbreaks of yellow fever occurred in 2017, most notably in Brazil and Nigeria, which prompted both countries to access vaccine doses through the Gavi-funded stockpile.

Due to the continued risk of outbreaks, coupled with the improved supply situation for the vaccine, Nigeria decided to resume its phased preventive yellow fever vaccination campaign. The campaign had previously been approved for Gavi support but had been put on hold after its last phase in 2013. Nigeria has also developed a long-term yellow fever control plan, which is closely aligned with WHO's EYE strategy.

The low routine yellow fever immunisation coverage across Gavi-supported countries is of concern, averaging out at just 36% in 2017. Four high-risk countries (Ethiopia, South Sudan, Sudan and Uganda) have yet to introduce the vaccine into their routine systems. In addition, surveillance and diagnostics systems, which play a key role in early detection and optimal vaccination response, are insufficient in many yellow fever-endemic countries.

Meningitis

Widespread Gavi-supported immunisation campaigns have virtually eliminated meningitis A in the "meningitis belt", which stretches from Senegal in the west to Ethiopia in the east. By the end of 2017, more than 279 million people had been vaccinated against meningitis A through Gavi-supported vaccination campaigns.

To sustain this progress in the long term, we started supporting routine immunisation with meningitis A vaccine in 2016. Since then, seven countries have added the vaccine to their national schedules – five in 2017 alone – and many more have expressed interest in introducing it in the next few years. This means that 50% of the countries in the meningitis belt are on track to roll out the vaccine in the near future.

On the flipside, we continue to see outbreaks of other meningococcal serogroups. A new hyper-invasive strain of meningococcal meningitis serogroup C is spreading across western parts of Africa, increasing the risk of outbreaks. The number of suspected meningitis cases increased from just over 18,000 in 2016 to more than 29,000 in 2017 – mainly caused by serogroup C.

Throughout the year, we worked with our partners to monitor the prevalence of different strains of meningitis and to ensure availability of appropriate meningitis vaccines through the global stockpile. Vaccines from the Gavi-funded stockpile were used to control large-scale epidemics of meningitis C in Niger and Nigeria, for example.

Cholera

We continued to see outbreaks of cholera across the globe in 2017, particularly in connection with natural disasters and humanitarian crises. Countries that experienced full-blown or potential outbreaks included Bangladesh, Haiti, Nigeria, Sierra Leone and Yemen. While Yemen chose not to use oral cholera vaccine to curb its outbreak until early 2018, many others relied on it as part of their efforts to control the disease in 2017.

One million Gavi-supported cholera vaccine doses were sent to Sierra Leone following devastating floods and landslides to prevent a widespread outbreak, while more than 670,000 doses were deployed to Haiti for a second round of vaccinations in the wake of Hurricane Matthew.

An emergency cholera vaccination campaign was also conducted in Cox's Bazar, Bangladesh, to help prevent the spread of cholera among the more than 650,000 Rohingya refugees who had fled across the border from Myanmar's Rakhine State, as well as in the host community. While the vaccination campaign was successful in preventing a large-scale cholera outbreak, the low basic immunisation coverage among the Rohingyas caused diphtheria to sweep through the refugee community, infecting thousands both in the camp and in the surrounding community. To address this, Gavi supported routine immunisation with the measles-rubella, pneumococcal, inactivated polio and pentavalent (protecting against diphtheria, tetanus, pertussis, hepatitis B and Hib) vaccines for 150,000 refugee children in Cox's Bazar.

Demand for the oral cholera vaccine is increasing rapidly. In the 15 years between 1997 and 2012, just 1.5 million doses of cholera vaccine were used worldwide. In 2017 alone, this figure had increased to 10 million doses. Recognising the continuing demand, in 2017 we started to explore options to extend our support for preventive cholera vaccine campaigns in endemic settings, which has so far only been approved for the 2014–2018 period.

We are also working closely with partners to ensure countries fight cholera through an integrated approach which comprises safe water, sanitation and hygiene (WASH), coupled with cholera vaccination.

Measles

In 2017, the number of measles deaths dropped to below 100,000 for the first time, an achievement that can largely be attributed to immunisation. However, coverage with the first dose of measles vaccine in Gavi-supported countries has plateaued at 78% – a long way from the 95% herd-immunity target. Coverage varies greatly across Gavi-supported countries, leaving many communities at high risk of outbreaks. While second-dose coverage rates are on the rise, they are still lagging well behind those of other routine vaccines.

2017 marked the first year of Gavi-supported measles vaccine introductions and campaigns under our new measles and rubella strategy. The revised approach involves increases in both vaccine support and introduction grants, as well as enhanced technical assistance from Alliance partners. It is intended to help countries deliver high-quality plans, implementation and evaluation of routine programmes and campaigns.

As part of the evaluation process, countries are now required to conduct independent surveys to track campaign coverage in a more reliable way. Of the seven countries that provided data following their 2017 campaigns, only one – Rwanda – met the 95% coverage target for measles vaccine, with a reported 97% coverage rate. Several countries appear to be stuck in a cycle of low routine immunisation coverage and repeated vaccination campaigns, also with inadequate coverage. However, two countries – Lesotho and Malawi – achieved 92% coverage in their 2017 measles-rubella catch-up campaigns, while Senegal reached close to 91%.

During 2017 we increased our collaboration with the Measles & Rubella Initiative, with particular focus on the six countries with the largest number of children who are not reached with a first dose of measles vaccine.

The bulk of our support for measles vaccine is allocated towards the combined measles-rubella vaccine, which also provides protection against congenital rubella syndrome. Coverage with a full course of rubella-containing vaccines in Gavi-supported countries amounted to 24% in 2017 – a 7 percentage point increase from the year before.

Polio

Although 2017 saw the lowest number of polio cases ever recorded, the "last mile" in the global effort to eradicate the disease is proving to be difficult. Wild poliovirus remains endemic in three countries: Afghanistan, Nigeria and Pakistan. As a result, the timeline for global polio eradication has again been delayed, this time to early 2021.

Our collaboration with GPEI to roll out inactivated polio vaccine (IPV) in all Gavi-supported countries – a key component of the global strategy to eliminate polio – continued to suffer from supply constraints during the year. As a result, 16 Gavi-supported countries had not yet managed to introduce the vaccine by the end of 2017, 14 had to discontinue their programmes due to shortages of the vaccine and 2 introductions were significantly delayed. Although the supply situation is improving, and some countries have since been able to resume their programmes, it is likely to remain fragile until 2020.

Despite the supply constraints, 55 countries had added IPV to their routine immunisation schedules by the end of 2017. Two of these, Angola and Liberia, were able to introduce the vaccine during the year. The latest estimates show that IPV coverage across Gavi-supported countries stands at 43%, as countries that have recently introduced the vaccine continue to scale up their programmes and others await sufficient supply to be able to launch.

The combination of delayed eradication timelines and global shortages of supply of IPV led the Gavi Board to extend the support for IPV from 2018 to 2020, subject to additional funding being made available.

New typhoid vaccine to protect millions of children

In a move to prevent millions of cases of typhoid and help combat the rise in antibiotic-resistant bacteria, the Gavi Board approved a new support window for typhoid conjugate vaccine in November 2017. Typhoid vaccines were first deemed a priority by the Board in the 2008 vaccine investment strategy but in the absence of a suitable vaccine, no financial commitment was made at the time.

Typhoid infects nearly 12 million people every year, most of whom live in developing countries. Improved living conditions and access to appropriate antibiotics have virtually eliminated the disease in high-income countries and have led to a dramatic reduction in the number of deaths globally. However, all this could change if drug-resistant strains of typhoid go unchallenged and continue to sweep across Africa and Asia.

The new conjugate vaccine, which was prequalified by WHO in December 2017, has several advantages over the older vaccines. Firstly, it is more effective and gives longer-lasting protection. Secondly, because it can be given to children under two years, it can be incorporated into existing routine immunisation schedules.

With the first countries expected to start introducing the vaccine in early 2019, it offers real hope for those threatened by typhoid.

A Nepalese child is immunised with the new typhoid vaccine.
Bill & Melinda Gates Foundation/2017

Looking ahead

The Vaccine Alliance is on track to help countries to immunise 300 million additional children in the 2016–2020 period, and to contribute to a significant increase in the number of vaccines each child receives. However, stagnating coverage rates for routine immunisation remain a trend that the Alliance is working hard to reverse.

The high frequency of vaccine-preventable disease outbreaks is also of concern and often a sign of persistent weaknesses in routine immunisation systems, particularly in the poorest and most fragile countries. We are working with a wide range of partners to help countries address this, but we recognise that this is a long-term process.

We are increasingly adopting more flexible, tailored approaches to meet the specific needs of fragile countries, where routine immunisation services are struggling to reach everyone with life-saving vaccines. This will require more innovative solutions and even greater levels of collaboration across the public and private sectors.

We are also looking at supporting new, life-saving vaccines. Our next vaccine investment strategy, due to be finalised by the end of 2018, will identify new vaccines and immunisation products for inclusion in our portfolio going forward, prioritising products that will maximise our impact.

In 2016, we took the decision to support the piloting of a malaria vaccine, with large-scale trials starting in 2018. Given the high mortality rates for malaria – especially among young children – the vaccine could have a significant impact if it is used in combination with other interventions, including spraying and bednets.

Making sure that people everywhere are fully protected with all the vaccines they need is vital to prevent disease outbreaks, protect global health security and safeguard the lives of all children – now and in the future.

Vaccines versus poverty

Most of us never have to choose between a life-threatening disease and a lifetime of crippling debt. Yet every year, hundreds of millions of people around the world are forced to make that choice. And, paradoxically, the hardest-hit people are not those with the largest medical bills, but rather those living in the poorest parts of the world.

Although some rich countries have notoriously high treatment costs, people living in poor countries actually spend more on healthcare relative to their income. And because medical insurance tends to be unavailable or too expensive, too often they and their families end up being pushed into poverty.

However, this tragedy – befalling some of the world's most vulnerable people – could in many cases be entirely avoided. A recent study in the journal *Health Affairs* suggests that there is another option: in many cases, medical bills can be avoided by prevention of disease through the widespread and affordable use of vaccines.

We already know that vaccines are one of the most cost-effective ways to prevent disease and death, and the new study provides additional supporting evidence. By modelling the health and economic impact of childhood vaccines for 10 diseases in 41 of the poorest countries, the researchers estimate that between 2016 and 2030, these vaccines will prevent 36 million deaths. But their analysis also found something else: during the same period, vaccination will prevent 24 million households from falling into poverty because of the cost of medical treatment.[a]

a – Chang AY, Riumallo-Heri C, Perales NA et al. The Impact Future Vaccines May Have on Averting Deaths and Medical Impoverishment in Forty-One Countries. *Health Affairs 2018*, 37(2).

Young boys playing in a Nigerian slum.
Gavi/2013/Adrian Brooks

The World Bank defines "poverty" as household income of less than US$ 1.90 a day. According to WHO, healthcare costs push as many as 100 million people below this threshold every year, with 150 million others facing "catastrophic healthcare costs". The latter is defined as healthcare spending that consumes 40% of the household budget after basic needs have been met.

All of this highlights the important role vaccination has to play in helping to reduce poverty. The fact that the study found that the greatest benefits of vaccination were among the poorest suggests not only that poorer people are more vulnerable and have a higher risk of developing preventable diseases, but also that the impact on their lives is potentially greater.

For the governments of low-income countries, this is an opportunity, because it shows what they can achieve in terms of improving health equity and reducing poverty by targeting higher vaccination rates in poorer and more marginalised communities. Moreover, by making affordable, quality healthcare available to everyone, regardless of their income, governments can take an important step towards achieving universal health coverage.

The study builds on a growing body of evidence that vaccines not only save lives, but also boost economies. Previous studies have estimated that every dollar invested in vaccines in 94 low- and middle-income countries saves US$ 16 in terms of healthcare costs, lost wages, and lost productivity due to illness. This figure increases to US$ 44 if the broader benefits of people living longer, healthier lives are taken into account. In Gavi-supported countries the impact is even greater: US$ 18 and US$ 48, respectively, per dollar spent.[b]

b – Ottawa S, Clark S, Portnoy A et al. Return on Investment From Childhood Immunization In Low- and Middle-Income Countries, 2011–20. *Health Affairs 2016* 35(2).

What the new study adds, however, is evidence of the tangible impact this has on people's lives. Over the next decade and a half, vaccines will save millions of families from the grinding misery of extreme poverty. This gives us yet another reason to work hard to realise the enormous potential of immunisation.

Between 2016 and 2030, vaccines will prevent 24 million households from falling into poverty

The health systems goal

increase the effectiveness and efficiency of immunisation delivery as an integrated part of strengthened health systems

Gavi/2013/Luc Forsyth

2017 at a glance:

- **Coverage with the first dose of pentavalent vaccine in Gavi-supported countries has flatlined over the past couple of years – an indication that some systems are still weak.**
- **The proportion of Gavi-supported countries that meet our benchmarks for integrated service delivery increased from 34% in 2016 to 44% in 2017.**
- **Countries were approved for support for 66,000 pieces of state-of-the-art, environmentally-friendly refrigerators and freezers through our innovative cold chain equipment platform.**
- **Gavi-supported countries received an average score of 68% for effective vaccine management, up from 67% in 2016.**

A platform for health

Currently, 80% of all children in the world's poorest countries are immunised with a full course of basic vaccines, and even more are reached through vaccination campaigns. No other health intervention touches as many lives, particularly during the first year of life.

Immunising millions of children, especially those who live in some of the most fragile and remote regions of the world, is a complex undertaking. Communities need to be informed about the benefits of immunisation, vaccines have to be kept cool on their long journey from depot to clinic, health workers and supply chain managers require training, and immunisation data needs to be collected and analysed. While all of these components must be in place to reach children with vaccines, they also serve as a platform for other health services.

Reaching the final "fifth child" – the one in every five children in the poorest countries who is still missing out on basic immunisation – is often the most difficult. He or she tends to live in a fragile country plagued by conflict or natural disaster or in an isolated rural area beyond the reach of health workers. Others may be "hidden" in urban slums or born into communities where there is little awareness of the benefits of vaccines.

Strengthening health systems is critical to reaching the "fifth child" and achieving one of the main goals of our 2016–2020 strategy: greater immunisation coverage and equity.

Our objectives

One of the main aims of our health system and immunisation strengthening (HSIS) framework, launched in 2016, is to identify and address bottlenecks to sustainable, high and equitable immunisation coverage.

When a country applies for new health system strengthening (HSS) support, we work together with national health authorities and in-country partners to ensure that the application includes a three- to five-year overview of all types of Gavi support: vaccine support, HSS support (including cold chain equipment) and technical assistance.

This helps to ensure that planned interventions are complementary and align with national health plans. It also means that health system strengthening activities can be better targeted and tailored to reach the children who are still missing out on vaccination.

Read more online
gavi.org/support/hss

The majority of our HSS funding is directed towards "strategic focus areas", or SFAs. These are the areas that we consider most likely to have a sustainable impact on coverage and equity, and where Vaccine Alliance partners have a comparative advantage.

By the end of 2017, we had introduced four SFAs: data; supply chain; sustainability; and in-country leadership, management and coordination of immunisation programmes. During the year, the Alliance started to move forward with demand generation as a potential fifth SFA.

Our 2016–2020 objectives reflect the critical importance of integrated immunisation programmes, investments that are key to improving coverage and equity, and enhanced partner collaboration. They are:

- to contribute to providing integrated and comprehensive immunisation programmes including fixed, outreach and supplementary components;
- to support improvements in supply chains, health information systems, demand generation and gender-sensitive approaches; and
- to strengthen engagement of civil society, private sector and other partners in immunisation.

Measuring progress

Drawing on past lessons, we have started to track the implementation and performance of our HSS investments in a more systematic and holistic way. We have developed a range of new tools and processes, such as grant performance frameworks (GPFs), joint appraisals and the partners' engagement framework (PEF), to help us do this.

GPFs set out the key metrics, or indicators, that are used to track the progress and results of all Gavi grants – from inputs and activities through to outputs and intended outcomes. Each GPF contains 20 standard or "core" programme indicators, as well as a number of country-specific indicators. The latter are agreed upfront before the grant is disbursed.

In 2017, 92% of countries reported on at least 80% of the agreed indicators, in line with our targets. The GPFs are used as an essential part of joint appraisals. This helps to ensure evidence-driven discussions and a strong focus on areas of reported underperformance.

The **joint appraisal** is conducted annually, usually in-country, by a team consisting of staff from the ministry of health, members of the interagency coordinating committee and health sector coordinating committee, Alliance partners and Gavi Secretariat staff. It is used to track the progress of Gavi support to inform grant renewal decisions and determine a country's needs for future technical assistance.

The introduction of **PEF** in 2016 has ushered in new ways of planning and monitoring the technical assistance provided to countries by Vaccine Alliance partners. "PEF functions" are a set of outputs and outcomes that are expected as a result of our support through PEF. The new framework allows us to track progress more systematically across countries and to identify and manage potential risks and bottlenecks more efficiently.

We also monitor the speed of our disbursements of cash support, including HSS. The average time between recommendation for approval of cash grants and first disbursement to countries increased from 11.6 months in 2016 to 12.9 months in 2017, some way from our year-end target of 9 months.

Breaking gender barriers to improve immunisation coverage

While boys and girls are vaccinated at similar rates at the national level in most countries, several studies suggest local variations, partly due to a range of gender-based factors that inhibit women's ability to ensure healthcare for their children. In addition to a lack of decision-making power, money and transportation, women's access to immunisation for their children is more likely to be hampered by low levels of education, limited privacy at the health clinic and burdensome household chores. In urban areas, in particular, clinic opening hours often clash with women's working hours.

Empowering women and improving their status in the family is critical to improving child vaccination coverage. The Gender Development Index, which measures the level of gender equality in different countries, bears testament to this: a high score has a strong positive association with vaccine coverage.

A recent WHO report showed that, in the 10 countries evaluated, basic immunisation coverage was consistently higher among children of educated mothers.[a] This highlights the need for communication strategies that reach out to women with little or no education.

The mother's age at birth also has an impact on the likelihood of her children being immunised. In the majority of the countries included in the study, basic immunisation coverage was highest among children with mothers aged 20–34 years.

Children who experience several types of disadvantages, such as having a mother who is both young and uneducated, are less likely to be immunised than those who only experience a single disadvantage. For example, the study found that children in Nigeria with mothers aged 20–34 years who were highly educated and belonged to a wealthy household in the southern region of the country were 300 times more likely to be immunised than their peers with teenage, uneducated mothers living in poor households in the north-west region.

Gender-related barriers to immunisation are among the most important equity obstacles that we help countries to address through our HSS grants. Our HSS guidelines require country applicants to call out gender-related barriers and encourage use of our support to tackle them. An analysis of 14 HSS proposals in 2017 found that all countries had, directly or indirectly, identified gender-related barriers as one of the reasons for low immunisation coverage.

However, although all 14 countries proposed interventions to overcome these barriers, only 6 directly allocated resources to do so. We also found that the level of knowledge of gender-related barriers remains low. Therefore, we have revised our application guidelines to include a definition of such barriers and potential interventions to address them, as well as relevant monitoring and evaluation indicators.

a – *Explorations of inequality: childhood immunization*. Geneva, World Health Organization, 2018.

Common gender-related barriers to vaccination

- Lack of female education lowers awareness of the benefits of vaccination
- Women cannot access family income to pay for transportation
- Information targets women only, even though it is often men who make decisions about the family
- Clinic opening times clash with working hours
- Women not allowed to leave the home without a male chaperone
- Lack of privacy at the health clinic
- No time to visit the health clinic because of household chores
- Lack of female health workers

Read more online
gavi.org/about/mission/gender/

Health workers discussing with mothers at a clinic in Haiti.
Gavi/2017/ Christophe Da Silva

Building universal health coverage

Universal health coverage – ensuring that every person everywhere has access to affordable, quality healthcare – would help to end extreme poverty, prevent millions of deaths and significantly reduce threats to global health security, making the world a safer place for everyone.

Achieving universal health coverage is an ambitious and challenging goal, particularly for the world's poorest countries. It is best tackled in stages, by focusing effort initially on primary healthcare and the most cost-effective solutions – in particular those that most benefit the poor.

Immunisation offers the ideal first step towards universal health coverage. It ranks among the most equitable interventions and disproportionately benefits the most marginalised populations. Vaccination directly contributes to 14 of the 17 Sustainable Development Goals by, for instance, helping to alleviate poverty and malnutrition, improving children's ability to perform well at school and increasing productivity.

In its most basic form, routine immunisation already reaches 85% of the world's children. If we expand this even further, we have a solid platform in place on which to build universal health coverage.

A closer look at 2017:

The performance indicators

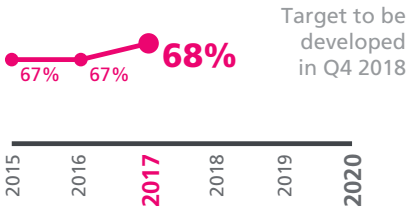
1 Supply chain performance

What we measure: the average score achieved by Gavi-supported countries that have completed WHO's effective vaccine management (EVM) assessment. This indicator helps countries to evaluate their immunisation supply chain performance over time against best practice standards, as well as to identify and respond to shortcomings. Among the features assessed are vaccine management, storage capacity, human resources and information systems.

2017 performance: Gavi-supported countries achieved an average EVM score of 68% in 2017, up from 67% 2016. A target for this indicator will be developed in late 2018. Nevertheless, it is clear that countries and partners have made important strides towards implementing our supply chain strategy:

- By the end of 2017, 34 countries had been approved for funding for more than 66,000 new, energy-efficient refrigerators and freezers under our cold chain equipment optimisation platform (CCEOP). We aim to have upgraded cold chain equipment in 40–50 countries by the end of 2020.
- Supply chain leaders in 15 Gavi-supported countries met competency requirements, having completed the STEP leadership development programme to build management skills and competencies. By 2020 we hope to have qualified leaders in 35 countries.
- 54 countries have conducted at least two supply chain management EVM assessments, 35 of which demonstrated improvements. Our aim is for all Gavi-supported countries to have implemented supply chain management plans by 2020.
- At least 31 countries are using various information systems to monitor their stock and manage their cold chain inventories. Our 2020 target is 30–40 countries.
- System design analyses were initiated in 11 countries; 7 were already implementing their findings to improve the efficiency of their supply chains. Our goal is for 10 countries to have completed this process by 2020.

Average score achieved by countries in WHO's EVM assessment



Source: WHO effective vaccine management global data analysis

Strategic focus area: supply chain

Immunisation supply chains in many developing countries date back to the time when the Expanded Programme of Immunization (EPI) was first established some 40 years ago. Supply chain improvements have often lagged behind the growth of immunisation programmes, which now deliver a wider range of vaccines to more people than ever before.

Common supply chain challenges include outdated and inefficient equipment, weak distribution systems, shortages of trained staff and a lack of reliable data to inform system improvements.

Our supply chain support, which focuses on five key areas: leadership, data, design, equipment and continuous improvement, is already delivering benefits. For example, the Ministry of Health in the Democratic Republic of the Congo (DRC) is using our support to build a new warehouse that will provide increased storage capacity for vaccines and immunisation products, as well as products for other public health programmes. This will help to deliver integrated health services and improve immunisation coverage and equity.

Read more online
www.gavi.org/support/hss/immunisation-supply-chain/

Cold chain equipment

Through the CCEOP, launched in 2016, we invest jointly with Gavi-eligible countries in state-of-the-art cold chain equipment. The platform helps countries improve their cold chains by switching to equipment that is not only more reliable and cost-effective, but also more environmentally friendly.

By the end of 2017, 34 countries had been approved for funding for a total of over 66,000 pieces of modern, energy-efficient refrigerators and freezers. Close to 700 solar-powered refrigerators have already been installed in two countries, DRC and Haiti. More than a quarter of the approved items are destined for previously unequipped facilities, thereby increasing the reach of the cold chain and helping to improve immunisation coverage and equity.

See also Cold chains **p34, p46–48**

New solar-powered fridges in Haiti
Gavi/2017/ Christophe Da Silva

Another STEP forward for improved supply chain leadership

Since 2015, Gavi has been working with a range of partners, including United Parcel Service (UPS) and the International Federation of Pharmaceutical Wholesalers (IFPW) to set up a new training course – the Strategic Training Executive Programme (STEP) – on health supply chain leadership. The first course was run in Rwanda's East African Community Regional Centre of Excellence for Vaccines, Immunisation and Health Supply Chain Management in late 2015. Two further courses started in 2016, one for francophone countries which was held at the LOGIVAC Centre in Benin, and another in Uganda with support from PATH.

2017 saw new STEP courses take off, this time in DRC and Pakistan. DRC's STEP programme had trained 18 Expanded Programme on Immunization (EPI) Executives by the end of the year, in line with Gavi's supply chain strategy. The participants benefited from mentoring by private sector managers and conducted short-term projects aimed at improving vaccine management in low-performing areas. In Pakistan, 15 executives were trained in leadership and managerial practices thanks to the new programme, which was rolled out in collaboration with WHO, UPS and IFPW.

So far, STEP's training courses have trained 76 supply chain executives from 15 countries, building a cadre of change-makers. By the end of 2020, as many as 500 immunisation supply chain leaders are expected to have graduated from STEP programmes across Africa and Asia.

See also STEP training **p48**

2 Data quality

What we measure: proportion of Gavi-supported countries with a less than 10 percentage point difference between different estimates of immunisation coverage.

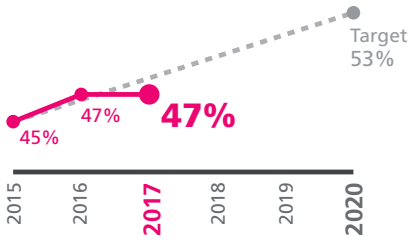
This indicator reflects the degree of consistency between available estimates of immunisation coverage. "Administrative coverage" refers to estimates based on national-level data reported annually by the country itself. "Survey coverage" refers to estimates based on data collected as part of household surveys, such as the demographic health survey, which is usually carried out every three to five years.

2017 performance: 47% of countries reported administrative coverage data within 10 percentage points of survey coverage, the same proportion as in 2016. This means that we are moderately off track to achieve our 2020 target of 53%.

See also Data in Nigeria **p52**

Read more online
gavi.org/support/hss/data

Percentage of countries meeting our benchmark for quality of immunisation coverage data



Sources: WHO/UNICEF Estimates of National Immunization Coverage; multiple indicator cluster surveys; demographic health surveys; other household surveys

Strategic focus area: data

Accurate data key to reaching the unreached

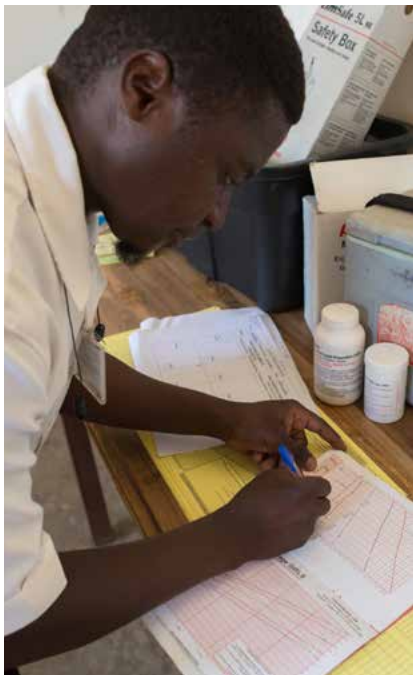
High-quality immunisation data is a vital part of the solution to the problem of tracking down the children who are still missing out on essential vaccines. To improve the amount, quality and use of available immunisation data in the countries we support, we launched a new data SFA at the end of 2015.

Our data SFA targets the 20 countries prioritised for immunisation coverage and equity improvements under PEF, and addresses the following areas:

- **Immunisation delivery, coverage and equity:** strengthening the quality of immunisation coverage data to help address bottlenecks.
- **Vaccine-preventable disease (VPD) surveillance:** helping countries strengthen their surveillance systems and use disease data to target and improve immunisation programmes. VPD surveillance systems are also a vital part of ensuring global health security and outbreak preparedness.
- **Vaccine safety surveillance and response:** establishing and improving data systems to detect adverse events and implement effective response and communication strategies.

The data SFA seeks to identify and support innovative ways to mitigate the risks of poor data quality. In 2017, investments were used to enhance data triangulation (cross-verification), improve subnational data and expand partner engagement. Strengthening civil registration and vital statistics is another priority area, as half of all children under five in sub-Saharan Africa have never been registered.

Examples of activities in 2017 include support for linking electronic vaccine registries to birth registries in Kenya, phone-based monitoring of vaccination campaigns in Indonesia and using SMS reminders to reduce drop-out rates in Côte d'Ivoire.



Health worker keeping records during a community outreach session in Maputo Province, Mozambique

Gavi/2017/Guido Dingemans

3 Coverage with a first dose of pentavalent vaccine and drop-out rate between the first and third dose

What we measure: coverage with a first dose of pentavalent vaccine and the drop-out rate between the first and third dose in countries we support.

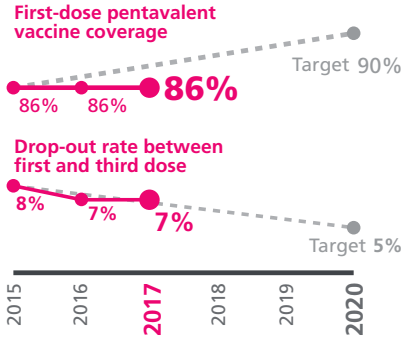
Taken together, these two measures provide a good indication of the ability of the health system to deliver immunisation services. High first-dose coverage coupled with low rates of drop-out from the first to the third dose suggests a strong health system, capable of reaching and fully immunising children with the required number of doses. A weaker delivery system may succeed in reaching a child with the first dose but not the third.

2017 performance: coverage with a first dose of pentavalent vaccine in Gavi-supported countries has remained flat at 86% since 2015, and we are not on track to reach our 2020 target of 90%.

The drop-out rate was 7%, the same level as in 2016. We are just on course to achieve our target for this indicator.

First-dose pentavalent vaccine coverage

Drop-out rate between first and third dose



Sources: WHO/UNICEF Estimates of National Immunization Coverage; United Nations Population Division

4 Integrated health service delivery

What we measure: percentage of countries we support meeting our benchmark for integrated delivery of antenatal care and immunisation services. A country meets this benchmark if coverage levels for four interventions – antenatal care and administration of neonatal tetanus, pentavalent and measles vaccines – are within 10 percentage points of each other, and all above 70%.

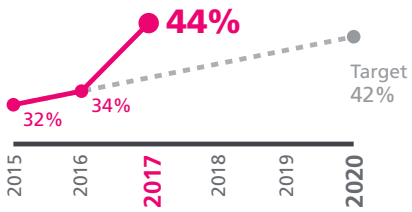
This indicator reflects the level of integration between immunisation and other interventions delivered through the routine system. If these complementary services are achieving similar levels of coverage, it generally follows that the linkages and coordination between them are strong.

2017 performance: 44% of Gavi-supported countries met the benchmark for integrated service delivery, an increase of 10 percentage points compared with the year before. In 2017 alone, close to 64 million children in Gavi-supported countries received three doses of a DTP-containing vaccine, such as pentavalent. This translates into more than 190 million points of contact between these children and the primary health system, all of which provide an opportunity to reach both them and their families with other essential health interventions.

Our work rests very much on the premise that immunisation offers a platform for the delivery of other healthcare services. For instance, vitamin A supplementation has been successfully linked with vaccination campaigns and routine immunisation services in many countries.

Deworming is also often delivered together with vaccination. In 2012, more than 78 million preschool children received deworming treatment at the same time as their vaccinations or vitamin A supplementation – corresponding to almost 25% of the children in need of treatment. Likewise, bednets tend to be distributed in tandem with the first dose of pentavalent, DTP or Bacille Calmette Guerin (BCG) vaccine, or the first or second dose of measles vaccine.

Percentage of countries meeting the benchmark for integrated service delivery



Sources: WHO/UNICEF Estimates of National Immunization Coverage; UNICEF global statistics database

5 Civil society engagement

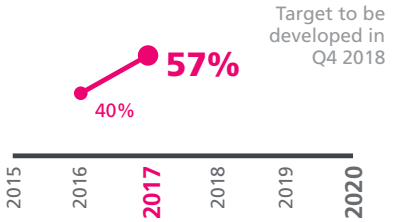
What we measure: percentage of countries we support that meet our benchmarks for civil society engagement in national immunisation programmes to improve coverage and equity.

We use three criteria to assess the level of civil society engagement:

- inclusion of civil society organisations (CSOs) in national immunisation plans with clearly stated activities;
- defined allocations in the EPI budget for CSO plans and activities (or justification given as to why these are not included); and
- documented evidence that CSO plans have been completed and/or are being implemented.

2017 performance: 12 (57%) of the 21 Gavi-supported countries for which data is available met all of the three criteria, up from 40% in 2016. A target for this indicator will be developed in late 2018.

Percentage of countries meeting the benchmark for civil society engagement



Source: Gavi, the Vaccine Alliance

Supporting civil society organisations to improve coverage and equity

Civil society organisations (CSOs) represent one of Gavi's most diverse constituencies and play a critical role in helping the Alliance achieve its strategic goals. They have a particularly important part to play in boosting access to immunisation among marginalised and hard-to-reach communities.

Around 10% of our 2017 HSS support was allocated to CSOs. The majority of the funding was used to finance activities for demand generation through social mobilisation and advocacy.

In addition to HSS funding, we provide specific grants for civil society engagement. This form of support is intended to increase the capacity and involvement of CSOs in immunisation system strengthening, service delivery and advocacy, and health sector planning. This helps to enhance collaboration between governments and civil society and deliver a more harmonised, country-driven approach to increasing community demand for and access to immunisation services.

The grant, which is available to 26 countries, is managed through contracts with the Catholic Relief Services and the Network of Platforms of National Non-Governmental Organisations of West and Central Africa. An independent evaluation, scheduled for 2018, will assess these grants.

In working with Alliance partners and the EPI team, CSOs have been instrumental in developing a 2017 report profiling urban slums in Karachi and Hyderabad, Pakistan. This involved identifying the number of slums across different towns and districts in both cities, reviewing the status of immunisation delivery and pinpointing barriers to improved immunisation coverage. The study will inform the urban strategy for Pakistan's immunisation programme.

In Burkina Faso, the CSO platform SPONG has been highly successful in reaching and strengthening local institutions and communities to improve immunisation coverage among hard-to-reach and marginalised populations. SPONG will receive additional HSS support to work with Alliance partners and the government to expand its outreach services.

Collecting immunisation data in Lahore, Pakistan
Gavi/2017/Asad Zaidi

See also Collaborating for change **p40**

Strategic focus area: in-country leadership, management and coordination of immunisation programmes

In 2017, we continued to give priority to improving in-country leadership, management and coordination as a means of ensuring that countries have the necessary institutional capacity to deliver effective immunisation programmes.

Our approach offers a "menu" of interventions that countries can apply for, including:

- management partners, or "peer coaches", embedded in the EPI;
- EPI performance management strengthening through data-driven tools and technologies;
- interactive EPI management training programmes;
- dedicated support to strengthen coordination forums, including inter-agency coordinating committees (ICCs) and health sector coordinating committees;
- funding of specific positions in ministries of health to develop operational guidelines for EPI teams; and
- "twinning" programmes and exchange visits.

Read more online
gavi.org/support/hss/leadership-management-coordination

Throughout 2017, Gavi rolled out a series of programmes aimed at strengthening EPI teams and national coordination forums. This included, for example, partnering with Dalberg to strengthen the ICCs in Guinea and Togo, and supporting improved coordination between the Ministry of Health and technical and financial partners in Comoros.

A successful leadership and management programme in Pakistan's Punjab Province was expanded, with Gavi support, to the Balochistan Province. The programme is designed to boost the strategic use of data in order to resolve management and coordination bottlenecks. In doing so, it has helped to raise Punjab's basic immunisation coverage by 29 percentage points since 2014.

See also Secrets to sustainability **p49**

The year also saw a blended approach of e-learning, remote mentorship and classroom training to boost the managerial capacity of governments to run immunisation programmes begin to take shape. The EPI Leadership and Management Programme, the fruit of a partnership between Yale's Global Health Leadership Initiative, the Rwanda-based University of Global Health Equity, PATH and Gavi, was set to launch in the first half of 2018.

Other examples of our support are technical assistance to coordination forums in Chad, the Congo and Guinea-Bissau; embedded managerial support in Malawi, Mali, Kyrgyzstan and Tajikistan; and a twinning approach between Timor-Leste and Sri Lanka to foster South-to-South skills transfer and prepare Timor-Leste for transitioning out of Gavi support.

Community health centre team in Ermera district, Timor-Leste

Gavi/2016/Antti Helin

Looking ahead

Since Gavi's inception in 2000, basic immunisation coverage rates in the world's poorest countries have increased by over 20 percentage points. More people than ever before are being reached with life-saving vaccines.

However, not all countries are reaping the full benefits of immunisation; some are lagging behind. Fragile countries – those that are conflict-ridden or hit by natural catastrophes – in particular are struggling to build sufficiently strong immunisation systems to protect their populations against fatal diseases.

Going forward, we will continue to find flexible, tailor-made solutions to help each country, especially those that are fragile, to improve their systems so everybody can benefit from life-saving vaccines. We will work across the public and private sectors to address barriers to, and bottlenecks in, immunisation programmes, be they outdated supply chains, insufficient or low-quality data and technology or gaps in the leadership, management and coordination of immunisation programmes.

Immunisation is one of the cornerstones of primary healthcare, and provides a gateway to universal health coverage. It is the only intervention that brings the vast majority of families into regular contact with health services, especially during the important first year of a child's life. This alone makes the immunisation system key to delivering primary healthcare services to all.

Delivering vaccines in Kazipur, Bangladesh

Gavi/2015/GMB Akash

The sustainability goal

improve sustainability of national immunisation programmes

2017 at a glance:

- **Another 8 countries transitioned out of Gavi's financial support, bringing the total to 16.**
- **Countries contributed a total of US$ 136 million towards the cost of Gavi-supported vaccine programmes.**
- **Countries fully self-financed 27 vaccine programmes originally introduced with Gavi support – up from 21 in 2016.**
- **Transitioned and transitioning countries invested US$ 48 million in vaccine programmes formerly supported by Gavi, up from US$ 20 million in 2016.**

Empowering countries to take ownership

Sustainability is at the core of the Gavi model. From the outset of our support, we work with all countries to help them take ownership of their immunisation financing and strengthen their systems so that they can eventually transition out of our financial support.

Every country we partner with is required to contribute to the cost of vaccines introduced with our support. As countries' economies grow, their co-financing obligations increase and we begin to reduce the amount of financial support we provide. The process by which a country gradually takes on the full cost of all its Gavi-supported vaccines is called "transitioning" and usually takes five years to complete. By the end of this period, countries are expected to be fully self-financing all their vaccine programmes.

Between 2016 and 2020, 20 countries are expected to transition out of Gavi support. Sixteen of these – Angola, Armenia, Azerbaijan, Bhutan, the Congo, Cuba, Georgia, Guyana, Honduras, Indonesia, Kiribati, Mongolia, the Plurinational State of Bolivia, the Republic of Moldova, Sri Lanka and Timor-Leste – had already done so by the end of 2017.

Our objectives

As a pioneer of sustainability, we are constantly learning from our experience and using that to refine our model. Today, our approach to sustainability extends far beyond just vaccine financing. To us, sustainability means that countries can successfully expand and sustain their national immunisation programmes with high and equitable coverage after they transition out of our support. They should also have sufficiently robust systems and well-functioning decision-making processes in place to facilitate future vaccine introductions, also to serve as a platform for other primary healthcare interventions.

Our specific objectives for this goal are:

- to boost national and subnational political commitment to immunisation;
- to help enable national human and financial resources to be allocated to immunisation appropriately by legislative and budgetary means; and
- to prepare countries to sustain immunisation performance after they transition.

These objectives are reflected in each country's transition plan, as well as in the long-term programmatic and financial sustainability goals we set for our investments. They shape how programmes are designed and carried out from the beginning of our support. Sustainability has been identified as one of Gavi's strategic focus areas for the 2016–2020 period.

Read more online
gavi.org/support/sustainability

The path towards self-sufficiency

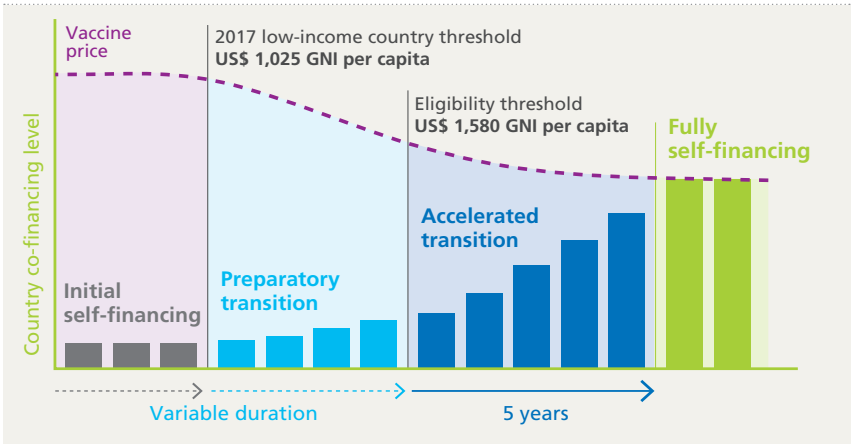
Gavi's approach to sustainability and transition is unique among development agencies. All the countries we support are required to pay a portion of the costs of their vaccines. Co-financing payments are not made to Gavi but to the vaccine supplier, either directly or through a procurement agency, such as UNICEF.

The size of the co-financing contributions is based on each country's ability to pay, as measured by its gross national income (GNI) per capita. For the purposes of co-financing and transitioning, we divide countries into three groups:

- **Initial self-financing:** country contributions are US$ 0.20 per dose – enough to enable country ownership but not so high that they deter the lowest-income countries from introducing new vaccines.
- **Preparatory transition:** co-financing payments increase by 15% each year.
- **Accelerated transition:** co-financing rises to 100% of vaccine costs over five years. If a country's GNI has increased particularly fast, we allow it two additional years to prepare for transitioning.

By the end of this process, governments are expected to fully self-finance all vaccine programmes originally introduced with Gavi support.

Gavi's co-financing model



Protecting sustainability post-transition

By 2020, half of the initial 73 Gavi-supported countries are expected to have transitioned, be in the process of transitioning or be close to entering the accelerated transition phase. More than ever before, enabling sustainable transition is at the heart of our mission.

Alliance partners work closely with countries right from the start to establish what will be needed to ensure a smooth, sustainable transition. This includes developing comprehensive transition plans before countries enter the accelerated transition phase.

Most countries are on track to transition successfully. However, some risk stagnating or even declining immunisation coverage post-transition, while others have not yet introduced some of the key, high-efficacy vaccines.

To mitigate these risks, in 2017 we committed to continuing to engage with transitioned countries in a more formalised, systematic way. We will now work with all countries post-transition, in a non-financial collaboration, to monitor performance, advocate for immunisation and facilitate sharing of lessons learned. Beyond this, we have made US$ 30 million available for technical support in the 2018–2020 period to address specific challenges facing transitioned countries.

We also need to make sure that countries do not miss the opportunity to introduce life-saving vaccines even after they have initiated the transition process. The Gavi Board thus agreed in 2017 that countries can still apply for vaccine support at any stage during the transition period, provided they have sufficient fiscal space to sustain the new programmes.

In an effort to ensure that countries do not face sudden vaccine price increases after they transition, several suppliers have agreed to offer selected vaccines – including pentavalent, pneumococcal, rotavirus and human papillomavirus – to transitioned countries at prices similar to those Gavi pays for a given time period and under specific circumstances.

Vaccine Independence Initiative

UNICEF's Vaccine Independence Initiative (VII) is one of the ways in which the Alliance is helping transitioning countries to meet their co-financing commitments. The VII provides credit to countries for vaccines purchased through UNICEF. Repayment is due 30 days after the vaccines have been delivered.

Since 2016, the VII has helped provide more than 90 million doses of vaccines to children in 23 countries faster than would otherwise have been possible. With the help of Gavi and other partners, VII funding has grown substantially – from US$ 15 million in 2016 to US$ 35 million in 2017.

As countries step up their investments in immunisation, they often face both short-term budget constraints and technical difficulties in procuring their own vaccines. With more and more countries on the road to transition, the VII plays an increasingly important role in improving the predictability and sustainability of vaccine financing.

Lao People's Democratic Republic: a holistic approach to transition

Lao PDR entered the accelerated transition phase in 2017. In collaboration with Vaccine Alliance partners, the country has done significant work to prepare for its transition out of Gavi support, scheduled for 2022.

Its comprehensive transition plan, developed in 2017, signals a vision that goes far beyond vaccines. Lao PDR's single plan brings together all aspects of programming – Gavi's health system strengthening (HSS) support and technical assistance; a reorientation of the HSS support to make it more sustainable; and intensified engagement with a wide range of partners such as the World Bank, the Sabin Institute and the Clinton Health Access Initiative, to prepare for a successful transition. Gavi support will also be contributing to the public financial management reform undertaken by the Ministry of Health to ensure strong coordination of all matters concerning the country's transition.

Lao PDR's commitment to immunisation started long before it embarked on its transitioning journey. Between 2000 and 2017, it increased its basic immunisation coverage from 50% to 85% and launched seven new vaccines. Over the same period, child mortality almost halved.

However, Lao PDR's transition is not problem free. Persistent weaknesses in the health system and service delivery, geographical challenges, and rapid but largely inequitable economic growth are all impeding efforts to improve immunisation coverage and equity. In addition, 70% of immunisation services are done through outreach, rather than in health clinics, and vaccine management is relatively poor.

Immunising the hard-to-reach, particularly ethnic minorities, who are often the most severely affected by disease outbreaks, is especially difficult. Lao PDR thus plans to make targeted efforts to address geographical, economic, ethno-linguistic and gender-related barriers to immunisation by partnering with a variety of stakeholders, including the World Bank.

All of these initiatives, coupled with strong political will to tackle the challenges that remain, will help Lao PDR to safeguard its achievements and continue to grow its immunisation programme even after Gavi's financial support ends.

A closer look at 2017:

The performance indicators

1 Countries on track to successful transition

What we measure: percentage of countries in the accelerated transition phase that are on track to transition successfully. A country is on track if:

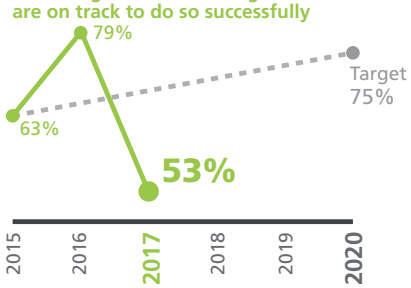
- at least 75% of predefined transition activities (such as a having a functional national regulatory agency) have been completed on time;
- DTP3 coverage has increased over the last three years (if a country has already achieved at least 90% DTP3 coverage, this level should have been sustained for three years); and
- it is meeting its co-financing obligations and did not default on payments in the previous year.

2017 performance: by the end of the year, 53% of countries in the accelerated transition phase were on track to transition successfully. The seven countries that were off track all failed to meet the immunisation coverage criteria and included five countries that transitioned out of Gavi support on 31 December 2017. We are addressing these challenges through a combination of tailored country approaches, post-transition engagement and transition grants.

In total, 15 transitioning and transitioned countries fully self-financed 27 vaccine programmes, compared with 14 countries and 21 programmes in 2016. Country contributions towards self-financed programmes in 2017 amounted to US$ 48 million.

An additional eight countries – Angola, Armenia, Azerbaijan, the Congo, Cuba, Georgia, the Plurinational State of Bolivia and Timor-Leste – transitioned out of our support at the end of 2017, bringing the total to 16 countries. Seven of these countries have already achieved DTP3 coverage rates of 90% or above. However, six transitioned countries saw basic immunisation coverage levels decline between 2016 and 2017.

Percentage of transitioning countries that are on track to do so successfully



Sources: Gavi, the Vaccine Alliance; WHO/UNICEF Estimates of National Immunization Coverage

See also Secrets to sustainability **p49**

2 Co-financing

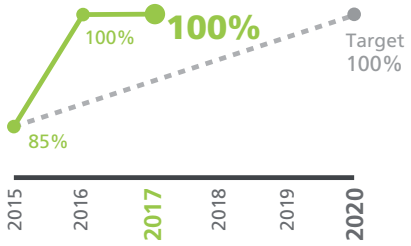
What we measure: percentage of countries that fulfil their co-financing commitments by the end of the year, or who pay their arrears in full within 12 months.

2017 performance: all countries met their 2016 co-financing commitments in that year or paid all their arrears in 2017. In addition, 58 out of 63 countries (92%) fulfilled their 2017 obligations in a timely manner.

Five countries, Cameroon, the Central African Republic, Chad, the Democratic Republic of the Congo and Sierra Leone, defaulted on their 2017 payments. Overall, this is on a par with the co-financing performance in 2016.

In terms of numbers of co- and self-financed programmes, however, 2017 proved to be the most successful year to date. Countries contributed a total of US$ 136 million towards their 2017 co-financing obligations and collectively co- or self-financed 197 programmes – up from 184 in the year before.

Percentage of countries with a co-financing obligation to Gavi that meet their commitments



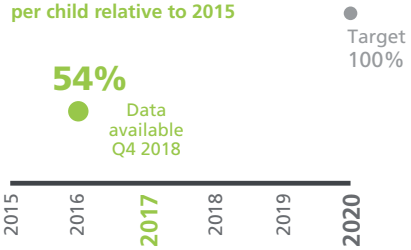
Sources: UNICEF Supply Division; the PAHO Revolving Fund; Gavi, the Vaccine Alliance

3 Country investments in routine immunisation

What we measure: percentage of countries that have increased their investment in routine immunisation per child, relative to 2015. This indicator takes into account every vaccine in a country's national programme, not just those supported by Gavi. It also includes expenditure on related products, such as injection supplies.

2017 performance: just over half of Gavi-supported countries increased their investment in routine immunisation between 2015 and 2016. Data for 2017 will be available in November 2018. The target for 2020 is that immunisation investment per child will have increased in all Gavi-supported countries.

Percentage of Gavi-supported countries that have increased their investment in routine immunisation per child relative to 2015



Sources: WHO/UNICEF Joint Reporting Form; United Nations, Department of Economic and Social Affairs, Population Division; World Bank, World Development Indicators

4 Institutional capacity

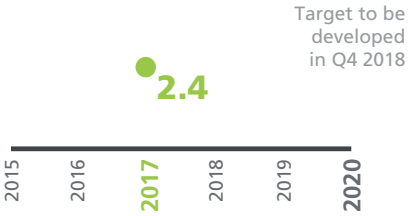
What we measure: average score of Gavi-supported countries measured against our criteria for national decision-making, programme management and monitoring. Through this indicator, we assess the performance and effectiveness of bodies that manage immunisation, including the Expanded Programme on Immunization (EPI), interagency coordinating mechanisms and national immunisation technical advisory groups (NITAGs).

2017 performance: Gavi-supported countries achieved an average score of 2.4 out of a maximum 4.0 in the institutional capacity assessment.

A score of 4.0 means a country is independently sustaining its systems, processes and capacity. Scoring 3.0 reflects a satisfactory government decision-making and coordination function and capacity to manage the EPI programme with technical assistance.

The relatively low average score reflects the fact that several Gavi-supported countries are still in the process of establishing new systems for planning, managing and monitoring immunisation programmes, or of strengthening existing systems. A target for this indicator will be developed in late 2018.

Average composite score for institutional capacity in Gavi-supported countries



Source: Gavi, the Vaccine Alliance

Peer-to-peer platform to support successful transitioning

May 2017 saw the launch of a pioneering forum for collective problem solving, dialogue and experience sharing among transitioning countries.

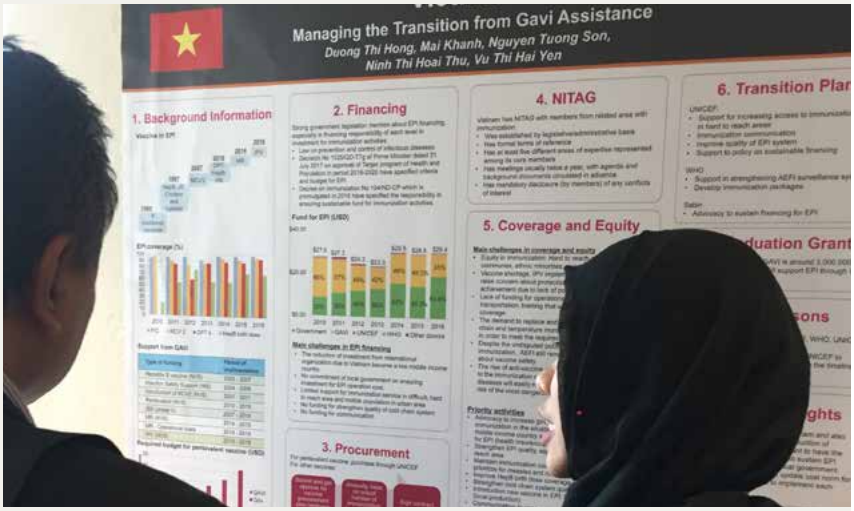
The Learning Network for Countries in Transition (LNCT) aims to improve the likelihood of countries successfully transitioning out of Gavi support by bringing countries and donors together to identify challenges, discuss possible solutions and share experiences and best practices. This will increase the chances of countries being able to maintain or increase immunisation coverage after they transition. The network also reinforces the skills and decision-making processes needed to support future vaccine introductions.

Current LNCT member countries include Angola, Armenia, the Congo, Georgia, Ghana, Indonesia, Lao People's Democratic Republic, Nigeria, Republic of Moldova, Sao Tomé and Principe, Sri Lanka, Sudan, Timor-Leste, Uzbekistan and Vietnam. Meetings are designed to be collaborative, including in-person get-togethers, study tours and an online members' platform.

The initiative is supported by Gavi and the Bill & Melinda Gates Foundation, and Results for Development leads the network coordination and the technical facilitation.

In 2018, the LNCT community plans to address critical topics such as making the case for increased investment in immunisation, vaccine procurement, vaccine hesitancy and universal health coverage.

Read more online
lnct.global



The Learning Network for Countries in Transition meeting in Vietnam
Gavi/2017

Looking ahead

Gavi's pioneering approach to sustainability in immunisation is, for the most part, working well. However, we recognise that some countries continue to face challenges on their road to sustainable transition. Together with our partners, we are making every effort to ensure that all countries can successfully progress towards self-sufficiency.

Almost half of the 20 countries that have already transitioned or are due to do so by 2020 have only introduced one or two of the four main vaccines in Gavi's portfolio: pentavalent, pneumococcal, rotavirus and human papillomavirus. In an effort to address this, we have extended the period in which transitioning countries can apply for new vaccine support.

Our sustainability model has evolved significantly in other important ways since 2000. In 2017, we took significant steps forward by formalising our engagement with countries that have already transitioned, and by agreeing with some of our key partners – the World Bank, the Global Fund and the Global Financing Facility – to further expand our collaboration around health financing and transition. We are also looking at how the Alliance can continue to shape vaccine markets to meet the needs of countries post-transition.

Peer-to-peer networking initiatives and South-to-South collaboration are making it increasingly possible for countries to share knowledge and best practices. We are helping to empower countries to truly own their transition and act as mentors within a dynamic, confident community. This will help to safeguard their progress long after our financial support ends.

The market shaping goal

shape markets for vaccines and other immunisation products

2017 at a glance:

- **The weighted average price of fully immunising a child with pentavalent, pneumococcal and rotavirus vaccines fell to US$ 16.63, a 12% drop from 2016.**
- **Two new lower-volume vaccine products, which will help reduce the pressure on cold chain systems, were procured.**
- **Three vaccine markets were assessed as having moderate health, one more than in 2016.**
- **The Alliance broadened its market shaping activities to include accelerating innovation, supporting country-owned decisions and assessing any unintended consequences of market shaping activities.**

Why market shaping matters

Nurturing healthy vaccine markets is a vital part of the Alliance's work. The fact that Gavi finances vaccines and other immunisation products for countries representing close to 60% of the world's annual birth cohort puts us in a unique position to shape markets.

Our market shaping activities are geared towards ensuring that supply meets demand, or more specifically, that manufacturers produce the right vaccines in the right quantities and at the right price to meet the needs of Gavi-supported programmes. We work with industry to help them forecast demand levels, and with countries to ensure they are able to access the vaccines they need at a price they can afford. By shaping markets in this way we can make donor investments go further and maximise our impact.

In the current strategic period we have broadened the scope of our market shaping activities to respond to evolving country needs. This includes extending our reach beyond vaccines to include immunisation-related products, such as cold chain equipment.

Given the growing number of countries that are transitioning out of Gavi support, we are increasingly focusing effort on securing the long-term sustainability of vaccine markets.

To lay the foundations for sustainable programmes, we also focus on supporting informed country decisions on product procurement and prioritisation. In addition, we are working hard to improve our forecasting methodology, and to assess any unintended consequences of our market shaping work.

Our objectives

The main goal of Gavi's market shaping efforts has always been to make vaccine markets work for the benefit of the poorest countries, ensuring that as many people as possible benefit from the life-saving potential of immunisation. In the early days of the Alliance, our focus was primarily on how to balance demand with supply, while promoting healthy competition to make sure that prices were sufficiently affordable for the countries we support.

While these ambitions remain at the core of our strategy, we are now taking a more holistic view of healthy markets. This includes working to improve the suitability of both vaccines and other immunisation products for developing country markets.

The objectives of our market shaping work are:

- to ensure sufficient and secure supply of quality vaccines;
- to reduce prices of vaccines and other immunisation products to an appropriate and sustainable level;
- to incentivise the development of suitable, innovative vaccines and other immunisation products; and
- to increase the number of healthy vaccine markets.

Read more online
gavi.org/about/market-shaping

The changing nature of market shaping

By the end of 2017, 16 countries had already transitioned from Gavi support and are now fully self-financing their vaccine programmes. Another four countries are on track to transition by 2020. In order to respond to the needs of the growing number of transitioning countries, we have adapted our strategy to focus more on ensuring that national immunisation programmes can be sustained and grow long after our financial support stops.

By sharing market information, tools and forecasting methodologies that strengthen in-country capabilities in immunisation, we can help developing economies navigate a smooth path to transition. Our purpose is to equip transitioning countries not only to sustain their immunisation gains but also to become strategic customers in the vaccine market.

Our current five-year supply and procurement strategy also sets out a clear role for product innovation. We continue to promote innovation and early adoption of products that better suit the needs of the countries we support – thus contributing to improving immunisation coverage and equity. We are also assisting countries to make informed decisions about product procurement and prioritisation.

We recognise, however, that we need to be aware of any potential unintended consequences of our interventions. The Alliance is thus taking steps to understand, and, if necessary, mitigate such impacts.

Doctors in the national polio and measles laboratory in Dhaka, Bangladesh

Gavi/2015/GMB Akash

Dealing with supply shortages

The slight dip in supply performance in 2017 was due to shortages of human papillomavirus (HPV), rotavirus and inactivated polio vaccine (IPV). However, prompt action on the part of the Alliance mitigated the impact of the rotavirus vaccine supply constraints and by the end of the year supply had been restored to pre-shortage levels. Going forward, we will continue to closely monitor the supply situation to address any potential issues that may arise.

Regrettably the supply shortages in the HPV vaccine market persisted throughout the year, a result of a spate of country applications following a shift in focus from pilot projects to routine introductions covering several age cohorts. Although this had been forecasted and shared in advance with the primary supplier, the dramatic increase in demand for the vaccine could not be met by the manufacturer.

The supply of IPV also continued to fall short of demand in 2017. However, supply is expected to increase in 2018 to better meet requirements. UNICEF's four-year tender issued in late 2017 should incentivise additional manufacturers to produce IPV, thus further improving global supply availability.

On the upside, 2017 saw significant improvements in the yellow fever market. Supply was sufficient to meet demand despite a major outbreak in Brazil and increased demand from Africa. The market for oral cholera vaccine also made progress, with a doubling of available supply despite demand uncertainties.

See also When demand surges **p34**

A fine balance – matching supply and demand of yellow fever vaccine

2017 was a watershed year for the yellow fever vaccine market. For the first time, thanks to investments made by manufacturers over the previous five years, supply was adequate to meet demand. This was despite significant outbreaks in Brazil and Nigeria, which drew on the global yellow fever vaccine stockpile to vaccinate those at risk of contracting the disease.

Nonetheless, significant challenges remain. The outbreak in Nigeria, which could threaten the market equilibrium if it continues or spreads, is a particular cause for concern. We are working with manufacturers to further increase supply and ensure that future demand can be met.

Since Gavi's inception in 2000, global yellow fever vaccine production has quadrupled to reach its current capacity of around 120 million doses per year. In the absence of major outbreaks, this should provide enough supply to meet demand for routine vaccination and mass campaigns and also to maintain the global stockpile.

The use of fractional dosing helped bring the Brazil outbreak under control, just as it did in the Democratic Republic of the Congo (DRC) in 2016 with support from Gavi. Evidence published by WHO suggests that as little as one fifth of the regular dose of yellow fever vaccine can provide protection for at least 12 months.[a]

In the event of an outbreak where supplies are under pressure, fractional dosing – as shown by the experiences of Brazil and DRC – can be a highly effective way of stretching vaccine stocks and protecting more people than would otherwise be possible.

Nurse, mother and child at a Nigerian immunisation clinic

GAVI/2013/Adrian Brooks

a – See: who.int/emergencies/yellow-fever/mediacentre/qa-fractional-dosing/en/. Accessed on 17 August 2018.

A closer look at 2017:

The performance indicators

1 Sufficient and uninterrupted supply

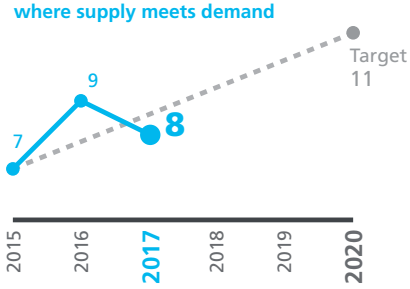
What we measure: number of Gavi vaccine markets where supply of appropriate vaccines is both uninterrupted and sufficient to meet demand.

2017 performance: by the end of the year, eight vaccine markets were reported to have sufficient and uninterrupted supply of appropriate vaccines – down from nine markets in 2016.

Markets meeting the definition of sufficient and uninterrupted supply were: Japanese encephalitis, measles, measles-rubella, meningitis A, oral cholera, pentavalent, pneumococcal and yellow fever. This represents 73% of the 2020 target of 11 markets.

Sources: Gavi, the Vaccine Alliance; UNICEF Supply Division

Number of Gavi vaccine markets where supply meets demand



2 Cost of fully vaccinating a child with pentavalent, pneumococcal and rotavirus vaccines

What we measure: the weighted average vaccine price of fully immunising a child with pentavalent, pneumococcal and rotavirus vaccines.

2017 performance: by the end of 2017, the cost of immunising a child with a full course of pentavalent, pneumococcal and rotavirus vaccines averaged US$ 16.63. This represents a reduction of 17% compared with the 2015 baseline figure of US$ 20, and a 12% drop from the 2016 price of US$ 19.

This progress was largely driven by the reduction in the weighted average price per dose of pentavalent vaccine, which fell to US$ 0.88 in 2017 – a 43% drop from 2016. The lowest price for this vaccine was US$ 0.68 per dose.

A reduction in the cost of pneumococcal vaccine also contributed; in 2017, two suppliers dropped their prices from US$ 3.30 and US$ 3.40 per dose, respectively, to US$ 3.05 per dose.

Source: UNICEF Supply Division

Weighted average price of fully immunising a child with pentavalent, pneumococcal and rotavirus vaccines

3 Innovation

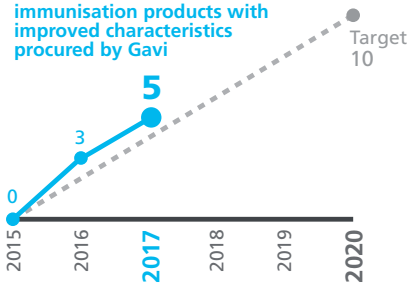
What we measure: number of vaccines and other related products with improved characteristics procured compared with the baseline year.

2017 performance: since 2015, five new products with improved characteristics have been prequalified by WHO and procured by Gavi, three in 2016 and two more in 2017. Our 2020 target is 10 products.

The two new products that were procured in 2017 comprised a new and improved presentation for the oral cholera vaccine, and a pneumococcal conjugate vaccine in a multi-dose vial presentation.

Both of these products will help lighten the load on countries' cold chains. The new oral cholera vaccine comes in a plastic tube, which takes up 30% less space and weighs 50% less than the previous glass vial product. It is also 25% cheaper. The four-dose presentation of the pneumococcal vaccine also offers a volume reduction benefit.

Number of vaccines and immunisation products with improved characteristics procured by Gavi



Source: Gavi, the Vaccine Alliance

4 Healthy market dynamics

What we measure: number of Gavi vaccine markets classified as enjoying high or moderate health. Each vaccine market is rated as having high, moderate, low or no healthy market dynamics.

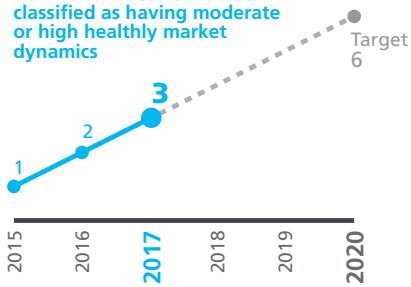
2017 performance: three vaccine markets were assessed as having moderate market dynamics in 2017, up from two in 2016. As yet, no market has been ranked in the "high" category.

The pentavalent vaccine market was one of three to be rated as moderate in 2017. It retained its rating from the previous year, partly on account of the substantial price drop that occurred during the year. The other two markets – those for yellow fever and pneumococcal vaccines – were upgraded to moderate from low health, because of improvements in supply and increased market stability.

In contrast, the market for HPV vaccine was downgraded from moderate to low because supply failed to keep pace with the increased country demand.

The remaining eight vaccine markets were classified as having " low" or "no" market health due to problems related to supply security and inabilities to meet country preferences.

Number of vaccine markets classified as having moderate or high healthly market dynamics



Sources: Gavi, the Vaccine Alliance; UNICEF Supply Division; SG4 partners' analyses of multiple market data sources

When demand surges: the HPV vaccine market

The Alliance works hard to provide both manufacturers and countries with reliable demand forecasts so that they can plan production, investments and introductions accordingly. At the same time, we want countries to be able to introduce appropriate vaccines as soon as they become available to ensure maximum protection against death and disability.

Occasionally, a surge in demand can lead to shortages of supply in a particular market. In 2017, that is what happened with the HPV vaccine. A sharp increase in demand following our new HPV vaccine programme was not matched by the leading manufacturer, resulting in a significant shortage in supply.

Responding to the increased demand for HPV vaccine will require investment in additional manufacturing capacity, as well as time.

Meanwhile, Alliance partners are working with countries to help them adapt to the supply situation by adjusting the timing of their introductions. In spite of the supply challenges, in 2017 three countries – Guyana, the Plurinational State of Bolivia and Sri Lanka – successfully rolled out the vaccine nationally and an additional four plan to do so during 2018. Also, a new tender will be issued to ensure supply for 2020 and beyond.

Beyond vaccines: easing the burden on the cold chain

In many countries, a weak and inefficient cold chain is still the main barrier to increasing immunisation coverage. An efficient cold chain is the vital artery ensuring that vaccines arrive at their destination at the correct temperature and can deliver their full life-saving potential. This is why the Alliance continues to work with manufacturers and countries to find novel ways to ease the pressure on cold chains – by reducing the volume of vaccine presentations and by improving the efficiency of the marketplace for cold chain equipment.

Both of these areas saw significant progress in 2017. The two new vaccine presentations prequalified for use during the year will both help relieve the pressures on the cold chain. The new oral cholera vaccine occupies 30% less volume and weighs 50% less than its predecessor. Likewise, the new multi-dose presentation of pneumococcal conjugate vaccine offers substantial space saving compared with the single-dose presentation.

Gavi's cold chain equipment optimisation platform (CCEOP), launched in 2016, continues to deliver in terms of shaping the market for cold chain equipment. Throughout the year, a wide range of new products became eligible for CCEOP support. This included 32 new models – 2 more than expected – of solar-powered refrigerators with an ice lining, which can keep the refrigerator cool overnight or on cloudy days. An additional 27 ice-lined refrigerators also became available. The latter, while being dependent on mains electricity or generator power, can keep vaccines cool for two days or more, even during power outages. Many of these new models require just eight hours of power a day to keep vaccines within the required temperature range.

The first-ever "Grade A" vaccine carrier, which reduces the risk of vaccines freezing during transportation and storage, was prequalified by WHO in December 2017 and is already available to eligible countries through the CCEOP.

The platform also helps with support for installation, maintenance and training, ensuring that new equipment is well looked after and will last.

There is early evidence that the price of these new technologies and associated service bundles are starting to come down, particularly in the case of high-volume orders. However, more work is needed to ensure that these products are affordable and sustainable for all countries, and that we have a sufficiently diverse supplier base.

Packing vaccines into cool boxes ahead of delivery in Mozambique

Nexleaf Analytics/2018

See also Cold chain equipment **p23**

Looking ahead

Throughout this strategic period and beyond, we will continue our work to strengthen the health of vaccine markets and diversify our supplier base through extensive engagement with both industry and recipient countries.

As an increasing number of countries transition out of our support, the need to monitor and forecast demand is ever more important. Transitioning countries will bring new factors into vaccine markets, both on the procurement side and on the funding side. This requires increased flexibility and broader engagement from all Alliance partners.

We are seeing greater diversity among the vaccine markets in which we operate, and acknowledge that we will need to continue to develop bespoke approaches to each one, and set our goals accordingly. For instance, it may not be possible to aim for a high level of healthy dynamics in every market.

In order to ensure we have the best possible understanding of vaccine market dynamics and market health, we will continue to refine and improve our demand models and data analysis functions. At the same time, we will continue to assess the mix of financial and non-financial interventions required to maximise the health of each market.

Since 2000, Gavi has successfully helped to raise immunisation rates across the countries we support. We are now seeing a growing number of countries procuring and funding their own vaccine supplies. However, we do not see this as the end of our role – we will continue to help countries sustain their immunisation programmes well into the future.

Vaccine warehouse in Lahore, Pakistan

Gavi/2017/Asad Zaidi

Funding and finance

Gavi/2017/Iryna Mazur – Isaac Griberg

Funding from donors and investors

Reinvigorated support with new political leadership

Donors have continued to demonstrate their commitment to Gavi, making the Vaccine Alliance one of the largest recipients of funds in global health. In 2017 alone, donors contributed US$ 1.7 billion, bringing the total to US$ 15.4 billion since 2000. By the end of the year, nearly 90% of all donor commitments made in Berlin in 2015, including multi-year pledges, had been translated into grant agreements.

This continued support comes at a time when donor countries are increasingly re-evaluating the impact of their official development assistance (ODA) in light of changes in political leadership. More than ever, they are looking beyond traditional ODA strategies to alternatives such as innovative financing, private-sector contributions and supporting countries to increase domestic funding – all of which are part of Gavi's unique funding model.

During the year, we continued our advocacy efforts in donor markets, working to reinforce the importance of immunisation and primary healthcare as top development priorities. We also collaborated with various stakeholders to align immunisation with other development and global health goals, including gender equality, education, poverty reduction, global health security and climate change.

Gavi's donor base

In 2017, Gavi received contributions from the European Commission and 21 donor governments: Australia, Canada, China, France, Germany, Ireland, Italy, Japan, the Kingdom of Saudi Arabia, Luxembourg, the Netherlands, Norway, the Principality of Monaco, the Republic of Korea, the State of Qatar, the Sultanate of Oman, Spain, South Africa, Sweden, the United Kingdom and the United States of America. Contributions from India, the Republic of Korea and the United Arab Emirates were renewed during the year.

Her Excellency Reem Al Hashimy, the United Arab Emirates' Minister of State for International Cooperation, speaking at a Gavi event at the World Economic Forum in Davos

Gavi/2018/Iryna Mazur

Read more online
gavi.org/funding

"With innovation being integral to the UAE Foreign Assistance policy, we look forward to working together with Gavi to support innovative health approaches that make a real difference to developing countries, ensuring that every child is protected with life-saving vaccines."

HE Reem Al Hashimy, Minister of State for International Cooperation, United Arab Emirates

Innovative financing

In addition to making direct contributions, donors and investors can support Gavi through various innovative financing mechanisms.

IFFIm: helping investors do well and do good

Since its launch in 2006, the International Financing Facility for Immunisation (IFFIm) has attracted more than US$ 6.5 billion in sovereign pledges and provided approximately US$ 2.6 billion towards Gavi's efforts to accelerate vaccine delivery in many of the world's poorest countries. IFFIm's "frontloading" capability has allowed more than 80 million children to be vaccinated ahead of time, without having to wait until Gavi has received pledged donor grants.

One of the main strengths of IFFIm as a funding mechanism is its flexibility. This allowed Gavi, in the wake of the 2014 west African Ebola epidemic, to commit US$ 300 million to procure and stockpile the Ebola vaccine by using IFFIm as a standby funding source. In this way, Gavi was able to signal a new market for the Ebola vaccine to manufacturers and, in turn, contribute to greater global health security.

Over the past decade, IFFIm's vaccine bonds have earned the reputation for being one of the best managed and most ethical and impactful socially responsible investments (SRIs) in the market place. The success of these bonds has prompted the financial markets to develop a set of common Social Bond Principles, which now underpin the SRI market.

Today, the appetite among investors for socially responsible investments is greater than ever and continues to grow. November 2017 saw the successful issuance of a US$ 300 million, three-year vaccine bond, which will provide us with additional means to respond flexibly to countries' immunisation needs as well as to new and evolving challenges in global health.

Credit: Rafael Matsunaga

AMC: accelerating uptake of pneumococcal vaccine

The Advance Market Commitment (AMC) has been supporting introductions of pneumococcal vaccines in the world's poorest countries for more than a decade. By the end of 2017, 58 countries had introduced the pneumococcal vaccine through the AMC, immunising more than 143 million children.

The AMC has also attracted new suppliers to the pneumococcal vaccine market, with many pipeline manufacturers developing pneumococcal conjugate vaccines. In 2017, an additional manufacturer registered with the AMC and a new four-dose presentation was deemed AMC-eligible.

In addition to contributing to more reliable supply, the AMC has helped to secure notable price reductions; current pneumococcal vaccines are offered to Gavi-eligible countries at less than 5% of the US public market price. The recent call for tenders saw a new lowest price for pneumococcal vaccine of US$ 2.95 per dose, which represents a saving of US$ 53 million by 2027. Current supply agreements (through 2024) are for a total 1.46 billion doses.

These developments contributed to the reclassification in 2017 of the pneumococcal vaccine market from "low" to "moderate" market health.

The majority of the 73 eligible countries have already been approved for pneumococcal vaccine introduction. Advocacy efforts for introductions in the remaining 14 eligible countries continue along with support to countries that have not yet applied for AMC eligibility.

Read more online
gavi.org/funding/iffim
gavi.org/funding/amc

Loan buydown: making affordable funding available for immunisation

Established in 2016, the buydown facility is an innovative three-way financing mechanism that provides Gavi with funding to improve immunisation coverage across Africa's Sahel region. Through the facility, Gavi, the Bill & Melinda Gates Foundation and the French Development Agency have pooled €100 million to be used for purchasing vaccines and strengthening health systems in Burkina Faso, Chad, Mali, Mauritania, Niger and Senegal.

The facility has helped Niger to introduce meningitis A, pentavalent, pneumococcal, rotavirus and yellow fever vaccines, as well as Burkina Faso, Mali, Mauritania and Senegal to launch the pneumococcal vaccine. It has also supported health systems strengthening efforts in Burkina Faso.

Weighing children at a health centre in Ouagadougou, Burkina Faso
Gavi/2018/Tony Noel

Private sector partnerships

The private sector has a key role to play in providing innovative solutions to some of the biggest challenges in immunisation. In recent years, Gavi has forged a series of pioneering private sector partnerships that have the potential to transform the way immunisation services are delivered in developing countries.

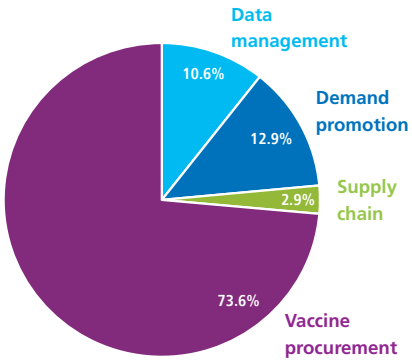
Maximising private sector investment to reach more children

The Gavi Matching Fund is a funding mechanism that doubles financial and in-kind contributions from private sector donors. In doing so, it has helped to secure significant private sector investment in immunisation. Supported by the Bill & Melinda Gates Foundation and the Government of the Netherlands, the Gavi Matching Fund has available funds totalling US$ 87 million for the current strategic period.

Gavi's INFUSE (Innovation For Uptake, Scale and Equity) initiative connects leaders in technology, business, investment, health and government to build an innovation ecosystem that has already facilitated breakthroughs in vaccine delivery. The platform is currently supported by the Governments of Canada and the United Arab Emirates and has available funding of US$ 21 million.

Since 2016, the Gavi Matching Fund and INFUSE have collectively enabled new partnerships worth over US$ 60 million that will help to advance Gavi's strategic focus areas for data management, demand promotion and supply chain, as well as vaccine procurement.

Private sector contributions by strategic focus area, 2016–2020



New and expanded partnerships

Vaccine delivery

FIT for purpose

In 2017, Gavi joined forces with its first African supply chain partner, Freight in Time (FIT), to address vaccine availability at the health facility level in Uganda. As the regional agent of Gavi partner United Parcel Services (UPS), FIT will transport and track vaccine shipments to more than 150 clinics in 3 districts. The logistics company will also monitor cold chain and vaccine storage to ensure more accurate stock balances and reduce wastage. To support FIT's efforts, UPS will provide management oversight, capacity building and analysis on how to optimise the supply chain and improve the skills of management staff. By combining UPS' global logistics expertise, FIT's local capabilities and Gavi's relationship with the Ugandan Government, the aim is to overcome some of the obstacles to vaccine delivery – especially over the important "last mile" of the journey from depot to clinic.

Zipline

Silicon Valley start-up Zipline helps to address bottlenecks in health supply chains by delivering medical provisions to hard-to-reach health centres with drones. In 2017, Gavi brokered a new partnership to scale up Zipline's existing service in Rwanda and expand the programme to neighbouring United Republic of Tanzania, where more than two thirds of the population live in rural areas. Here, more than 100 drones will be deployed to deliver medical supplies, such as blood and rabies vaccine for emergency use.

Demand generation

Girl Effect

Girl Effect, a not-for-profit organisation that builds local youth brands to empower girls, is teaming up with Gavi to generate demand for immunisation against human papillomavirus (HPV), the main cause of cervical cancer. In Ethiopia, Malawi and Rwanda, this innovative, girl-centred partnership is laying the foundations for leveraging brands and mobile platforms to raise awareness of and demand for the HPV vaccine. Formative research for the project is conducted by qualified researchers who use mobile technology to carry out baseline studies among girls in their communities. Girl Effect shares its innovative approaches to demand generation with the ministries of health and technical working groups, while Gavi helps the countries to purchase the HPV vaccine.

Empowering girls in Ethiopia
Girl Effect/2017/Aron Simeneh

Improving data and demand generation with Orange

In 2017, Gavi and Orange SA embarked on a project that uses Orange mobile technology to inform parents in Côte d'Ivoire about the importance of vaccination and to remind them when their children's vaccinations are due. The "M-Vaccin" phone app will help to tackle the gender-based education gap – a key barrier to immunisation – by providing mothers with information about vaccines in their native language while simultaneously sending the same message to the father or a relative. The technology is also designed to help health workers capture community data and use it to create family-specific vaccine schedules and improve monitoring. The five-year partnership will be implemented in up to 29 districts in Côte d'Ivoire where immunisation coverage is below the national average, or where drop-out rates are high.

See also Innovation **p47**

Read more online
gavi.org/funding/matching-fund
gavi.org/infuse

Driving innovation with INFUSE

INFUSE has created a unique community that brings together innovators, private sector partners, international organisations and the Vaccine Alliance. To date, the platform has identified 14 high-impact innovations, or INFUSE "pacesetters", each with proven potential to deliver social return on investment.

INFUSE 2017 pacesetters

INFUSE 2017 called for tech-enabled innovations capable of increasing immunisation uptake and improving health service delivery in developing countries. Seven new pacesetters were identified in 2017.

parsyl

An accessible logistics dashboard with predictive modelling that combines information from standalone wireless parcel sensors with customer and external data.

Operating countries: Senegal, Uganda

giftedMom™

A two-way communication platform that leverages mobile technology to connect parents and healthcare workers and provide automated SMS reminders to support follow-up.

Operating countries: Cameroon, Haiti, Nigeria

ZENYSIS

A structured data analytics approach which consolidates diverse sources into an integrated view, allowing decision-makers to understand complex situations and effectively allocate resources.

Operating countries: Angola, Ethiopia, Pakistan, Rwanda

mPedigree
Bringing Quality to Life

A smart vaccine label that records vaccine temperatures, allows parents and officials to verify authenticity of the product, and digitises valuable data to improve cold chains.

Operating countries: Egypt, Ghana, India, Kenya, Nigeria, the United Republic of Tanzania, Rwanda, Uganda, Zambia

logistimo

An open source forecasting, optimisation and transport orchestration software built on machine learning and user-centred design to improve the efficiency of supply chains.

Operating countries/ continents: Africa, India

MEDIC MOBILE™

An open source and locally-developed mobile software platform that facilitates collaboration between health workers across geographies and time to improve immunisation coverage and equity.

Operating countries: Madagascar, Mali

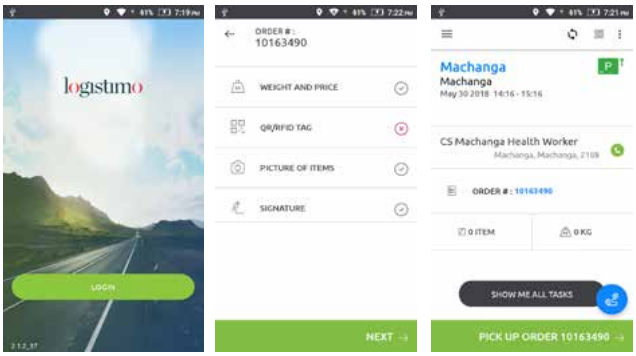
FLOWMINDER.ORG

An advanced machine learning tool that combines geographic, human mobility and demographic data to improve population estimates and optimise resource allocation.

Operating countries/continents: Africa, Asia, South America

See also Innovation **p47**

Pacesetter highlight: LOGISTIMO



The Logistimo mobile phone app

Credit: Logistimo

2017 INFUSE pacesetter Logistimo is transforming immunisation supply chains through a software platform that allows data to be collected from remote facilities in areas with low or no network connectivity.

Using Gavi's health system strengthening support and with the help of UNDP's Electronic Vaccine Intelligence Network, India has rolled out the system in more than 11,000 primary health centres in 13 states. Logistimo's machine learning capabilities help India to optimise stock management, allowing it to save up to US$ 150 million in vaccine costs every year.

Logistimo has also been rolled out at national, provincial and district level in Zambia, where it has contributed to reducing processing times by 93% to less than one day.

Partnership in action: NEXLEAF

ColdTrace: wireless remote temperature monitoring for vaccine fridges in rural areas

Credit: Nexleaf Analytics

Nexleaf Analytics manufactures temperature sensor devices specifically designed for refrigerators used to store vaccines in developing countries. With support from Alliance partners, Nexleaf is developing a cloud-based performance dashboard that will transform data collection on cold chain equipment in Kenya, Mozambique, Senegal and the United Republic of Tanzania. Gavi will be using Nexleaf's ColdTrace technology, along with other temperature monitors, to relay real-time data on temperature and other indicators to supply chain managers via a cloud-based dashboard.

The data, which will be shared both with health ministries and Gavi staff, can be used to help reduce vaccine wastage and schedule maintenance activities.

In order to allow Nexleaf to build the dashboard and scale its technology in emerging markets, in 2017 Gavi secured financial investments worth US$ 3.8 million from Google.org and ELMA Philanthropies. These investments were then doubled by the Gavi Matching Fund.

Evidence from Kenya has shown that by using remote temperature sensors, health ministry staff were able to increase the performance of vaccine refrigerators by 30% and reduce heat and cold exposure by 78% and 60%, respectively.

Immunisation: reaching the unreached

More countries are facing fragility and devastating disease outbreaks, while others are struggling to sustain and grow their immunisation programmes – especially as they prepare to transition out of our support. But change also brings new opportunities to find those who are missing out, whether through innovative supply chains, better quality data or tailor-made support for fragile countries.

Five features illustrate different paths on our Alliance's journey to reach the unreached.

Collaboration → p40

Collaborating for change

Burkina Faso provides a shining example of collaboration between donors, as well as of integration of immunisation with other health services.

Fragility → p43

Fragile settings call for special measures

A fast, flexible and coordinated approach is required to reach people living in, or fleeing, fragile communities.

Supply chains → p46

Modernising supply chains to reach the unreached

Vaccines can only do their job if they reach people, and they can only reach people if supply chains are effective and efficient.

Transition → p49

Secrets to sustainability

Timor-Leste has been twinned with Sri Lanka, which has an excellent track record in immunisation, as part of a new initiative to help countries transition successfully from Gavi support.

Data → p52

Good immunisation needs good data

Until recently, Nigeria reported close to 100% administrative coverage for three doses of diphtheria-tetanus-pertussis vaccine. The country has now accepted survey data indicating just 33% coverage and is taking action to fix its data quality challenges.

Collaboration

Burkina Faso: Collaborating for change

Burkina Faso prides itself not only on having one of the highest vaccination coverage rates in Africa, but also on successfully using immunisation as a means to deliver other health services. The country's experience shows what can be done through high-level political support and a willingness on the part of all stakeholders to collaborate across the health sector.

Credit

Prof. Nicolas Meda, Burkina Faso's Minister of Health

Delphine Sandwidi, EPI nurse, Burkina Faso

Gavi/2018/Tony Noel

Without strong political commitment, immunisation programmes often fail to live up to early expectations. This has, however, not been the story in Burkina Faso. Free access to immunisation was introduced by President Thomas Sankara in 1987, and continues to this day. "The President's commitment," explains Professor Nicolas Meda, Burkina Faso's Minister of Health, "is tangible in the fact that healthcare for children under five and for pregnant women has been free since 2015, and in that the 2018 budget will be 5 billion CFA francs [US$ 8.9 million], compared to scarcely 2 billion in 2015." The Minister of Health intends to continue to increase this budget allocation year-on-year.

Capitalising on this high-level support for child health, Burkina Faso's health sector is harnessing immunisation programmes as a platform for other interventions. "Vaccination is a great gateway to healthcare!" says Delphine Sandwidi, the nurse in charge of the Expanded Programme on Immunization (EPI) at the Dassasgho Centre for Health and Social Advancement (Centre de Santé et de Promotion Sociale, or CSPS) in Ougadougou, Burkina Faso. Sandwidi, who has been working at the CSPS for 23 years, speaks enthusiastically about the broader impact that vaccination has had in terms of improving access to healthcare.

Vaccination clinics provide health workers with the ideal opportunity to identify children, parents and caregivers who are in need of other health services. "Every day, during weighing and measuring, I take advantage of children's visits to refer them to other services if necessary – especially those suffering from malnutrition," Sandwidi explains.

For many pregnant women, vaccination clinics are their first interaction with health services. When an expectant mother brings her older children to be vaccinated, nurses and doctors can make use of this point of contact to provide advice, medical examinations and any necessary vaccinations, and to encourage her to come back for follow-up visits. "If they like the welcome they get at the health centre, they will feel confident about coming back," says Sandwidi.

Discussions prior to vaccination sessions also provide an opportunity to inform parents about health issues beyond immunisation. In Burkina Faso, where nearly half of all medical consultations and a quarter of hospital admissions in 2017 were due to malaria, pre-vaccination discussion sessions can be a means of disseminating information on ways to prevent this devastating disease.

EPI: a platform for health

While the EPI is by its very nature focused on providing vaccination, it does not operate in isolation. It requires some level of health infrastructure to be in place if it is to be effective and efficient, including a supply system that can transport vaccines from central stores to the most remote villages and trained healthcare staff who can deliver those vaccines. This system can be, and in virtually all countries is, used as a platform to deliver other primary healthcare services.

The EPI is well established in Burkina Faso. Says Dr Anne Vincent, UNICEF's representative in the country: "By building on the EPI's maturity, we can achieve success in other parts of the health system. The EPI is instrumental in establishing and strengthening the health system, and it allows other programmes to be bolted onto it."

The integration of the EPI and the broader health system is particularly evident in rural parts of the country. Here, community nurses or midwives are typically in charge of all aspects of healthcare. "We really encourage health workers to take advantage of every contact opportunity in order to provide maximum health care and to take a holistic view of the child," explains Dr Alimata Jeanne Diarra-Nama, WHO's representative in Burkina Faso. "We incorporate activities that have proved to be worthwhile, such as vitamin A supplementation, seasonal chemoprophylaxis and other essential interventions. It has to become part of the culture."

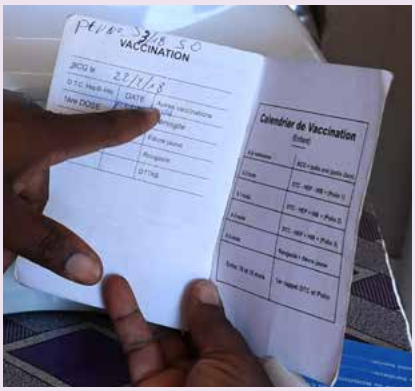
This approach is not restricted to health centres, but is also very much part of the ethos of many small community-based organisations. In Tanghin-Dassouri, a rural area some 50 kilometres outside of Ouagadougou, the nurse in charge of the EPI, Albert Sekoué, works closely with ALAVI, an AIDS association founded in 1995. In addition to their core programmes, which are focused on increasing access to healthcare among the most vulnerable, ALAVI organises awareness sessions on HIV, malaria and immunisation with the help of its community-based health workers.

Dr Anne Vincent, UNICEF representative, Burkina Faso

Gavi/2018/Tony Noel

Albert Sekoué, EPI manager at the Tanghin-Dassouri medical centre, Burkina Faso

Gavi/2018/Tony Noel



Vaccination card in the Dassasgho health centre, Burkina Faso

Gavi/2018/Tony Noel

Loading an EPI motorbike

Gavi/2018/Tony Noel

Pooling resources to reduce duplication

Abdoul Karim Ouedraogo is the coordinator of the Programme d'Appui au Développement Sanitaire (PADS), an organisation responsible for ensuring a coherent allocation of international funds to the health sector. According to Ouedraogo, in 2017 the Global Fund to fight AIDS, Tuberculosis and Malaria financed the operation of 263 CBOs and paid part of the salaries of 17,688 community-based health workers.

The work of these community-based organisations and health workers is by no means restricted to the three diseases covered by the Global Fund. For example, one organisation is helping to identify and register all children who do not yet have a vaccination booklet.

In the same way, EPI motorbikes, which are financed by Gavi to facilitate immunisation outreach, are being used for a range of other interventions. In isolated rural health clinics, which need to cover large geographical areas, it is important to be mobile enough to reach people who themselves have no means of transportation.

This pooling of resources is unanimously welcomed. As Abdoul Karim Ouedraogo points out: "It optimises the management of funds provided by our international partners."

For Dr Issa Ouedraogo, Director of Vaccination Prevention, pooling assets has benefits in terms of greater equity in the allocation of resources. "The duplication we used to come up against is avoided, and it has had an immediate impact in the field. More people are benefiting, access to health facilities is easier and the quality of healthcare has improved."

Interagency collaboration

Increasing levels of interagency collaboration is also delivering benefits at the administrative level. The newly-established strategic EPI management exchange committee, chaired by Burkina Faso's Minister of Health, brings together a wider group of partners with a diverse skillset.

Says Jean Nouboussi, country portfolio manager for Burkina Faso at the Global Fund: "We have always planned things together with Gavi to avoid duplication of resources, but our collaboration now goes much further. We work closely together to coordinate support, field missions and capacity building."

Joining hands to modernise the supply chain

Cross-agency collaboration has led to a new initiative to replace old electric fridges with modern, solar-powered ones – an investment that will benefit the wider health system. "For us, the switch to solar energy is a no-brainer," explains Abdou Diallo, nursing officer in charge of the Tanghin Dassouri Medical Centre. "It will lead to greatly improved preservation of vaccines, for one thing, and it will also benefit our entire structure. Although the initial investment is substantial, the savings we will make over the long term are beyond doubt."

Diallo's view is shared by the Minister of Health, who stresses that while Burkina Faso has 90% vaccination coverage, it does not yet have 90% vaccine effectiveness. "We have a cold-chain problem, which we are working with Gavi to solve by replacing the whole system." UNICEF is highly involved in the project, providing technical support and procurement assistance thanks to its expertise in cold chain equipment.

Gavi/2018/Tony Noel

Meanwhile, collaboration with the Global Fund is at the heart of a project which uses digital tablets to collect data on childhood diseases and immunisation. Ahawo Komi M. Alain, Gavi's senior country manager for Burkina Faso, describes how the initiative was conceived: "Last February I visited a health centre in Ouahigouya together with my counterpart at the Global Fund to watch a demo of mHealth tool being used to collect data on childhood illness. It targets the same age bracket as immunisation. As we watched, we had the idea that the same tool should be used to collect vaccination data."

This collaboration is fundamental to Burkina Faso's efforts to strengthen its health system. As Diallo points out, the benefits are immediate: "Thanks to vaccination and a more efficient health system, children no longer miss school and parents can maintain their level of income. Together we are fighting poverty."

WASH + vaccination versus cholera

Zambia has suffered cholera epidemics every year for the past 35 years. To prevent these devastating outbreaks, immunisation needs to work hand in hand with efforts to improve water and sanitation.

"I've seen cholera. It's a very bad disease, it kills in a very short period of time." A primary school teacher and resident of Zambia's capital, Lusaka, Lillian Sakalor in many ways personifies Zambia's integrated response to this terrible illness. She works both as a water, sanitation and hygiene volunteer, regularly doing community outreach in local slums, and as a volunteer vaccinator. In this latter capacity, she helps to administer oral cholera vaccine as part of an emergency campaign to control the worst cholera outbreak the country has seen since 1999.

The outbreak, which started in October 2017, has resulted in more than 5,000 cases and over 100 deaths. "It's because of the increase of the population," says Sakalor. As more people move into the slums, water and sanitation resources are put under increasing strain. In a densely populated subdistrict of Lusaka called Kanyama, for instance, 10,000 full pit latrines regularly contaminate the water table.

The good news is that Zambia is responding to the threat of cholera outbreaks through mass campaigns targeting likely epicentres with both oral cholera vaccines and the promotion of clean water and better sanitation and hygiene.

Cholera vaccination campaign in Zambia
Gavi/2018/Duncan Graham-Rowe

Sakalor is at the heart of this effort. When she is not helping to vaccinate people at one of the 63 vaccination sites in Lusaka or going door-to-door through the slums as a mobile vaccinator, she is busy with water, sanitation and hygiene (WASH)-related outreach activities. One day she may be inspecting the condition of latrines, dispensing chlorine or working with community leaders, and the next she may be raising awareness about the importance of handwashing, clean water and sanitation.

She wanted to volunteer because she has seen the devastating effects of cholera first hand. "It's easy to spot when someone has it," she says. "They've got severe diarrhoea, vomiting and dehydration. People are dying, and then the families. They are suffering."

Thanks to the efforts of volunteers like Sakalor, people are more aware of the disease and are eager to get the vaccine. "We make an effort to follow them in the field. We go door-to-door," she says. "Sometimes we use the megaphone to announce it."

Fragile states

Lorenzo Pezzoli/WHO

Fragile settings call for special measures

A fast, flexible and coordinated approach is required to reach people living in, or fleeing, fragile communities

Imagine being a child and seeing your world crumble, either reduced to rubble by bombs, laid bare by a natural disaster or eroded by political and social instability. Imagine leaving the only world you've ever known because of events beyond your comprehension or control for an unknown future someplace else.

In 2017, that is what happened to millions of children living in fragile countries in Africa, the Middle East, Asia and beyond. Not only were they forced to cope with the direct consequences of conflict and other humanitarian crises, they also had to contend with unsafe and unsanitary living conditions that dramatically reduced their chances of staying healthy. Large numbers of already vulnerable people have become increasingly exposed to outbreaks of debilitating, and potentially fatal, infectious diseases.

Sadly, their experiences are becoming the norm. It is estimated that in 2017 over 1.6 billion people, or 22% of the global population, were living in fragile settings.[a] Furthermore, in 2017 fragile countries were collectively home to nearly 50% of all underimmunised children in Gavi-supported countries. Approximately half of these children lived in Nigeria and the rest in 17 other fragile countries.

The plight of vulnerable children in fragile settings demands a fluid, innovative response – one that is fast and flexible, maximises collaboration and coordination between the Alliance and its partners, and directs support to precisely where and when it is needed most. With the approval of its fragility, emergencies and refugees policy, that is what the Gavi Board delivered in June 2017. This new policy aims to protect the most vulnerable living in an increasingly fragile and fractured world.

It means that when unexpected crises occur, vaccines as well as financial and operational help can be quickly mobilised, and if necessary, health system and immunisation strengthening funding can be reallocated to improve the delivery of vital vaccines. Countries that host large numbers of refugees can get additional funding to immunise them, and Gavi can grant exceptional support for vaccines that are outside of its regular portfolio.

a – *States of Fragility: 2016 report.* Paris, Organisation for Economic Co-operation and Development, 2016 (oecd.org/dac/states-of-fragility-2016-9789264267213-en.htm; accessed 17 August 2018).

Working to protect refugees

Since September 2017, more than 650,000 Rohingya refugees have crossed into Bangladesh, fleeing violence and persecution in Rakhine State in neighbouring Myanmar. They have taken shelter in refugee camps in the Cox's Bazar region close to the border, where a lack of safe drinking water and hygiene facilities, crowded living and poor nutrition quickly provided conditions ripe for the spread of contagious disease.

Vaccinating Rohingya refugees against cholera
UNICEF/2017/Lemoyne

Recognising the threat, in late September 2017, the Bangladeshi Government started to work with development partners to improve immunisation rates among refugees in the camp, including by requesting additional vaccine support from Gavi.

An emergency cholera vaccination campaign, financed by Gavi through the global stockpile, prevented a large-scale outbreak of the disease. Gavi also funded additional vaccines for all 150,000 refugee children, aiming to prevent a range of diseases such as polio, measles, rubella, pneumonia, diphtheria, whooping cough and hepatitis B.

Yet despite the extensive efforts by the Ministry of Health and Family Welfare and aid workers, a diphtheria outbreak spread throughout the camp, infecting thousands of refugees – a result of the low level of vaccination among the Rohingya people in Myanmar – as well as members of the host community.

Health agencies again carried out an emergency vaccination campaign, this time to contain the diphtheria outbreak. This situation demonstrates how poor routine immunisation significantly raises the risk of outbreaks of epidemics, and the importance of a rapid, coordinated response when they emerge.

In Africa, Uganda has become home to the continent's largest refugee population, hosting some 1.5 million people that used to live outside its borders. A huge proportion arrived from South Sudan, the world's youngest country, and one of its most fragile, beset by protracted conflict.

Under the new fragility, emergencies and refugees policy, the Alliance has been able to support Uganda in a number of ways, providing additional doses of vital vaccines for refugees, and helping UNICEF and the national government to conduct large-scale catch-up immunisation campaigns, targeting all refugee children under the age of five. Crucially, these campaigns, scheduled for early 2018, will deliver pneumococcal, pentavalent and measles vaccines simultaneously as part of a coordinated effort to immunise vulnerable refugee populations against a series of diseases.

The support has extended back into South Sudan itself, where national coverage of the third dose of diphtheria-tetanus-pertussis vaccine (DTP3) dropped to just 26% in 2017.

A Gavi health system strengthening (HSS) grant provided vital support to maintain immunisation and other basic healthcare services in conflict areas and to rebuild them in areas that became stable. During 2017, this grant was used to support the formation of community partnerships and platforms, involving more than 700 schools and 32 radio stations. It also enabled around 2,500 community mobilisers to make house-to-house visits, bringing routine immunisation to more than 700,000 people.

Large movements of people, such as those witnessed in Myanmar and Uganda in 2017, pose a particular challenge to global health security. According to the UN Refugee Agency, at the start of 2017 there were more than 65 million displaced people worldwide, 22.5 million of them refugees.[b] Most refugees leave their native countries with very few possessions and often without documentation. As a result, many are unable to access basic, preventative healthcare in their host countries. Huge crowds living and moving together also create conditions for infectious disease to quickly spread.

b – *Statistical Yearbook 2016*. Geneva, UNHCR, 2017. Available at: unhcr.org/statistics/country/5a8ee0387/unhcr-statistical-yearbook-2016-16th-edition.html. Accessed on: 17 August 2018.

Delivering immunisation in conflict zones

The conflict in Syria has had a devastating impact on its health system. Although Syria is not eligible for Gavi-support, in 2017 the Gavi Board – recognising the acute humanitarian crisis occurring within its borders – approved an annual amount of up to US$ 25 million for the 2017–2018 period to strengthen the cold chain and the delivery of pentavalent, inactivated polio and measles-mumps-rubella vaccines.

The support has helped to improve the stability of Syria's immunisation programme and contributed to increased coverage and uninterrupted supply across all vaccines. Nevertheless, coverage remains low and in 2017, Syria experienced outbreaks of both measles and vaccine-derived polio in areas where immunisation services had been interrupted for a long time.

As further demonstration of the challenges of providing healthcare services within conflict zones, the UN's Humanitarian Response Plan (HRP) for Syria, which finances the operational costs of immunisation activities for WHO, UNICEF and other partners, is short of funds. By the end of 2017, only 50% of the HRP's estimated funding needs had been met.

Yemen has also been destabilised by armed conflict. In a stark reminder that war provides the perfect environment for disease to spread, in 2017 nearly one million Yemenis were infected with cholera. Over 2,000 people lost their lives to this preventable disease. Gavi's response was, in collaboration with its partners, to release 1 million doses of cholera vaccine from the global stockpile. However, despite the urgent need for the campaign it was not able to start in 2017.

Acknowledging the country as a fragile state, Gavi continued to work through partners to provide support to Yemen throughout 2017. The Alliance approved a request to fund 2.1 million additional doses of pentavalent vaccine and exceptional support for 7.7 million doses of tetanus-diphtheria vaccine. Yemen also applied for support for a measles-rubella follow-up campaign.

Family in Yemen
Gavi/2013/Alazz Alzain

Fighting cholera in fragile settings

In addition to the flexible support provided under the new policy, Gavi funds emergency vaccination campaigns in some of the most fragile countries in the world. For instance, prompt action on the part of Gavi and its partners helped to contain several outbreaks of cholera in 2017.

Floods and landslides devastated parts of Sierra Leone in August, leaving millions vulnerable to waterborne diseases, including cholera. Within weeks of the appearance of the first cases, the International Coordinating Group for Vaccine Provision released enough oral cholera vaccine doses from the Gavi-funded global stockpile to protect half a million people in the country, which was still recovering from the impact of the 2014 Ebola epidemic.

In September, Gavi, WHO and partners delivered more than 900,000 doses of oral cholera vaccine, enough to vaccinate everyone over the age of one year, in a bid to halt the spread of cholera in Nigeria's Borno state.

Cholera vaccination campaign in Zambia
Gavi/2018/Duncan Graham-Rowe

Post-Ebola recovery

While humanitarian crises in fragile settings often lead to disease outbreaks, epidemics themselves can tip communities into a state of fragility. That is what happened in west Africa during the 2013–2015 Ebola outbreak, which claimed more than 11,000 lives. The three most severely affected countries in the region – Guinea, Liberia and Sierra Leone – have since relied on Gavi support to help recover their health and immunisation services.

In Liberia, Gavi helped to quickly rebuild essential health services, preventing outbreaks of other vaccine-preventable diseases. Basic immunisation coverage has now surpassed pre-Ebola rates of 76% in 2013 to reach 86% in 2017, having collapsed to 50% during the height of the Ebola epidemic in 2014.

In both Liberia and Sierra Leone, we collaborated with the Global Fund to ensure complete alignment of our health system strengthening investments.

Gavi was among the first development partners to respond to Guinea's urgent post-Ebola need for immunisation and health system strengthening (HSS) assistance. Support was in place by mid-2015, six months before the country was declared Ebola-free, and continued through 2017. Our HSS support enabled the recruitment of health staff, the provision of technical assistance and the procurement of cold chain equipment, trucks and motorcycles to transport vaccines and conduct outreach and supervision activities, helping Guinea to recover a virtually collapsed immunisation and health system.

The Democratic Republic of the Congo (DRC) experienced another flare up of Ebola in May 2017, and the emergency supply of 300,000 doses of experimental Ebola vaccine that Gavi has been instrumental in making available was nearly called upon. However, other measures were able to bring the outbreak under control in this case. Once the vaccine has been licensed, the Alliance has committed US$ 300 million for future Ebola vaccine procurement to protect against future outbreaks of this deadly disease.

Gavi's work in fragile settings serves to underscore the value of working together with partners. It is only through close collaboration, and by adopting flexible approaches, that we are able to support immunisation programmes in some of the most difficult and trying of circumstances. In these fragile settings, where health needs are often acute, Gavi support needs to be delivered quickly and effectively to ensure that as many vulnerable people as possible get the vaccines they need.

Preparing for Ebola vaccination in DRC
Gavi/2018/Pascal Barollier

Supply chains

Modernising supply chains to reach the unreached

In some parts of the world it is now possible to order goods or groceries online and have them delivered straight to your door within 24 hours. In most low-income countries, however, it is an entirely different story. Poor roads and ageing or non-existent infrastructure can make a delivery of any kind a real challenge.

The logistics of vaccine deliveries can be especially problematic. This is not only because vaccines need to be kept cold during their journey from depot to clinic, but also because often the people who need them most live in the least accessible places.

Since 2000, Gavi has supported close to 400 vaccine introductions and seen the number of immunised children rise significantly. Despite this, pockets of low coverage remain, even in countries with seemingly good national coverage. These hotspots of low coverage represent the world's most vulnerable children. If we are to continue to increase coverage, we need to find ways of immunising these children.

Vaccines can only do their job if they reach people, and they can only reach people if supply chains are effective and efficient. Strengthening supply systems is thus a central part of Gavi's efforts to improve immunisation coverage and equity in the countries it supports. In 2017, Gavi worked with a range of private- and public-sector partners to kick start what will likely be the single biggest revamp of vaccine supply chain infrastructure and management in more than four decades of the Expanded Programme for Immunization (EPI).

Gavi/2018/Karel Prinsloo

Upgrading outdated cold chains

A key component of the supply chain revamp is Gavi's cold chain equipment optimisation platform (CCEOP). The platform utilises the same innovative market shaping principles that has enabled Gavi to reduce vaccine prices to accelerate the introduction of affordable and innovative cold chain equipment across the estimated 135,000 supply chain points in Gavi-supported countries.

In some countries, cold chain equipment has scarcely been upgraded since the EPI was first introduced over 40 years ago. Before the introduction of the CCEOP, one in five facilities that needed cold chain equipment did not have it, and in those that did, one fifth of the installed devices did not function. Where equipment was working, performance was substandard, with 60% of storage units running the risk of exposing vaccines to excessive freezing or unacceptably high temperatures.

The CCEOP aims to address precisely these kinds of issues by encouraging manufacturers to increase production, stimulate innovation and reduce the cost of state-of-the-art cold chain equipment. With an initial US$ 50 million upfront commitment, it was designed to give manufacturers the confidence to develop and produce innovative cold chain equipment adapted to the needs of developing countries. By helping countries to purchase and maintain this equipment, Gavi removes one of the main barriers standing in the way of cold chain modernisation. The initial commitment has now been increased five-fold to match anticipated demand over the next five years.

Since the launch of the CCEOP, Gavi has committed to helping countries purchase more than 66,000 pieces of cold chain equipment for more than 55,000 sites. Two thirds of these items will replace outdated or broken equipment, while the remaining third will help expand existing cold chain facilities.

Gavi-supported solar-powered fridges delivered to the Kenscoff health centre, Haiti

Gavi/2017/ Frederique Tissandier

The first country to take advantage of the CCEOP was Haiti. With help from Alliance partners, Haiti used the platform to overhaul its outdated cold chain infrastructure. In 2017 the first consignment – comprising more than 190 state-of–the-art solar-powered fridges – was deployed to rural and mountainous areas.

Powered by renewable solar energy, these fridges freeze an ice liner during the day that later keeps the unit cold either overnight or on cloudy days. With no need for a battery or a control unit, these fridges – unlike older models – are not reliant on the kind of components that are prone to failing. This simple innovation also eliminates the need to transport heavy and expensive propane fuel over large distances.

Most Gavi-supported countries are eligible for CCEOP support. Depending on a country's gross national income per capita, Gavi will cover between 50% and 80% of the total cost of the purchase, delivery and installation of new equipment. Countries themselves are expected to cover the remaining cost.

Innovation key to improving vaccine delivery

The CCEOP is not the only market-based approach that Gavi has rolled out to stimulate supply chain innovation. Innovation for Uptake, Scale and Equity in Immunisation (INFUSE), launched in 2016, also does this by identifying tried-and-tested innovative technologies that have the potential to improve vaccine delivery in developing countries. These are then "infused" with capital to help businesses and innovators take their solutions to scale.

In January 2017, Gavi and Google.org announced an INFUSE partnership to help tech start-up Nexleaf Analytics develop an analytics platform which monitors cold chain performance in real time. Nexleaf's cloud-based platform uses its ColdTrace technology, in combination with other temperature monitors, to relay real-time temperature data and other information about vaccines to supply chain managers.

After initial introductions and scale ups in Kenya, Mozambique, Senegal and the United Republic of Tanzania, it is hoped that this innovation will eventually help all Gavi-supported countries to better manage their cold chain networks and improve efficiency.

Zipline drones, supported by Gavi and the UPS Foundation, reduce the time required to deliver life-saving medical supplies from hours to minutes.

Gavi/2018/Karel Prinsloo

Innovative technologies are also being used in India, a country which has struggled in the past to reliably monitor its vaccine stocks. Through its health system strengthening support, Gavi is supporting the Government of India to roll out the Electronic Vaccine Intelligence Network (eVIN) nationwide. The system will help track the movement of vaccines across India's vast network of 27,000 cold chain points. Public health officials use a mobile phone app to record the temperature of cold chain equipment in real time and to log vaccine transactions. The data is uploaded to the system and then used to create and audit vaccine inventories.

Through INFUSE, Gavi is working with companies such as Logistimo to extend the reach of such electronic logistics management systems to other countries.

2017 also saw the launch – quite literally – of the world's first nationwide autonomous drone delivery service for medical supplies such as blood and blood products in Rwanda. This unique project, which is led by the Rwandan Government, was brokered by Gavi – bringing together the US drone company Zipline and the UPS Foundation.

Fixed-winged drones are launched into the air by catapult-like devices and fly autonomously to a specified GPS coordinate. Just before the drone reaches its destination, the clinician who ordered the blood or plasma receives a text message notifying them that their delivery is about to arrive. On arrival, the drone descends to a lower altitude, releases its cargo, which falls to the ground by parachute, and then returns to base.

Currently half of all blood supplies in Rwanda are delivered this way. This service allows the Government to centralise supplies in its capital Kigali, reducing waste to almost zero. For people in remote, rural districts in need of an emergency blood transfusion the benefits are obvious, as average waiting times have been reduced from 4 hours to just 20 minutes. Gavi is now working with Zipline and other drone delivery companies to see how this remarkable technology can used to deliver vaccines.

See also Private sector partnerships **p37–38**

The right training for the right people

Innovative technologies and the right infrastructure can only achieve so much, and by themselves are not enough. Supply chains also have to be well run. To help countries improve their supply management capabilities, Gavi launched its Strategic Training Executive Programme (STEP) in Rwanda's capital, Kigali, in 2015 – an innovative programme aimed at improving the skill set of supply chain managers.

Drawing on expertise from the public and private sector, including partners such as UPS and the International Federation of Pharmaceutical Wholesalers, in 2017 STEP was delivered by the East African Community Regional Centre of Excellence, based in the University of Rwanda, and the LOGIVAC Centre in Benin. STEP uses both remote and in-person training to enhance the skills of senior immunisation supply chain managers. Mentorship provided by private sector leaders forms a crucial part of the course. Since its launch, the programme has expanded to 15 countries.

STEP has proved such a success that the Alliance is now looking at ways to emulate it as part of a broader strategy to strengthen leadership, management and coordination across all Gavi-supported countries.

The EPI Leadership and Management Programme, a similar initiative developed in partnership with Yale's Global Health Leadership Initiative, the University of Global Health Equity and PATH, will provide medically-trained professionals with the management skills they need to run effective EPI programmes.

Dr Agnes Binagwaho, Vice-Chancellor of the University of Global Health Equity, speaking at the new EPI Leadership and Management Programme in Kigali, Rwanda

Gavi/2018/Karel Prinsloo

See also Supply chain leadership **p23**

Interview with Evodie Mudaheranwa, vaccine supply chain officer, Rwanda's Expanded Programme for Immunization (EPI), and STEP graduate

What are your responsibilities within Rwanda's EPI programme?

"I'm in charge of the supply chain desk, so I oversee all activities related to storage and distribution. I'm also involved in planning how many vaccines we will need in the whole area."

How have you used your STEP learnings to address challenges in your job?

"We used the tools from STEP to start a long overdue temperature monitoring study of vaccines in transit. This meant measuring the temperature at which vaccines were stored as they were transported from the central store to the districts, and then on to the health centres. Through the study we have cascaded the temperature monitoring training across the supply chain, since everyone we train goes on to train more people in their districts."

What other impact has STEP had on the way you work?

"Before joining this programme, I had been doing things my own way. I would take activities in parallel and work on more than one at the same time. So I couldn't make them perfect or finish them on time. After joining this programme, I learnt how to prioritise and make things better. From then on I started identifying bottlenecks. I sat down and thought critically about the issues and solved them one by one together with my team."

How are you using your knowledge to train others?

"After we have acquired new skills, we go back and cascade them down the supply chain. We are learning a lot about how to empower other people, how to enable them. I think this is the most important thing we gain – empowering others."

Transition

Secrets to sustainability

Transition and twinning

Timor-Leste, one of the world's youngest countries, has been twinned with Sri Lanka, which has an excellent track record in immunisation, as part of a new initiative to help countries transition successfully from Gavi support.

WHO/SHOBHAN

In a small village outside Suai, near Timor-Leste's border with Indonesia, a health worker explains the benefits of immunisation to a group of young women, many of whom have a baby resting on their hips. Flipping through a chart showing the impact of each vaccine-preventable disease, he urges them to bring their children to the clinic for immunisation. It is a passionate performance and his audience swells as he works his way through the chart.

Afterwards, amid the usual backdrop of cries and tears, the women bring forward the children who are due their vaccinations. Watching all of this is someone who, while not Timorese, is a true friend of the country – a Sri Lankan doctor and WHO immunisation expert, Dr Sudath Peiris. Dr Peiris is one of the driving forces behind a Vaccine Alliance-sponsored programme that twins doctors and health workers in Timor-Leste with their counterparts in Sri Lanka. He is in Timor-Leste to offer advice and suggestions to his Timorese peers on how to improve immunisation services.

"It is very important that health workers go out to the community," Dr Peiris says. "We have been able to make a little bit of progress and now health workers start going out to the community, finding kids and starting them on immunisation."

Twinning for transition

Timor-Leste (formerly known as the Indonesian province of East Timor), has been twinned with Sri Lanka, which has an excellent track record of sustained high immunisation coverage, as part of a new initiative to help countries transition successfully from Gavi support. This process sometimes requires a degree of flexibility and some lateral thinking.

Timor-Leste rapidly reached the level of gross national income per capita that triggers the start of the transitioning process. For some countries this can cause problems, especially if the fledgling transitioning country has not had sufficient time to build up a strong immunisation system.

In this instance, the solution proposed was to build a system of twinning and support that would link Timor-Leste with another country that had recently transitioned and which has successfully maintained high rates of immunisation coverage. A detailed memorandum of understanding between the two governments was agreed and duly signed in September 2017, and the programme has been actively supported by WHO with Gavi funding.

Twinning in action

The twinning programme works like this: a group of senior health officials from Timor-Leste travelled to Sri Lanka to see how various parts of the healthcare system, including logistics and supply centres, were organised and managed. A few weeks later, Sri Lankan officials went to Dili to see if some of their practices could be employed to improve services in Timor-Leste. The reciprocal visits laid the foundation for further collaborative work, including exchanges at the grassroots level and detailed planning of activities aimed at strengthening immunisation systems in five key areas: policy development; procurement and supply chain management; data management; vaccine supplies quality and safety; and disease surveillance.

Within South-East Asia and beyond, Sri Lanka is seen as an immunisation success story, with basic immunisation coverage rates consistently touching 99%. It is also a country that has recently transitioned from Gavi support, despite a recent period of civil unrest. While the parallels with Timor-Leste are not exact, they are close enough for the twinning arrangement to be seen as a win for both sides.

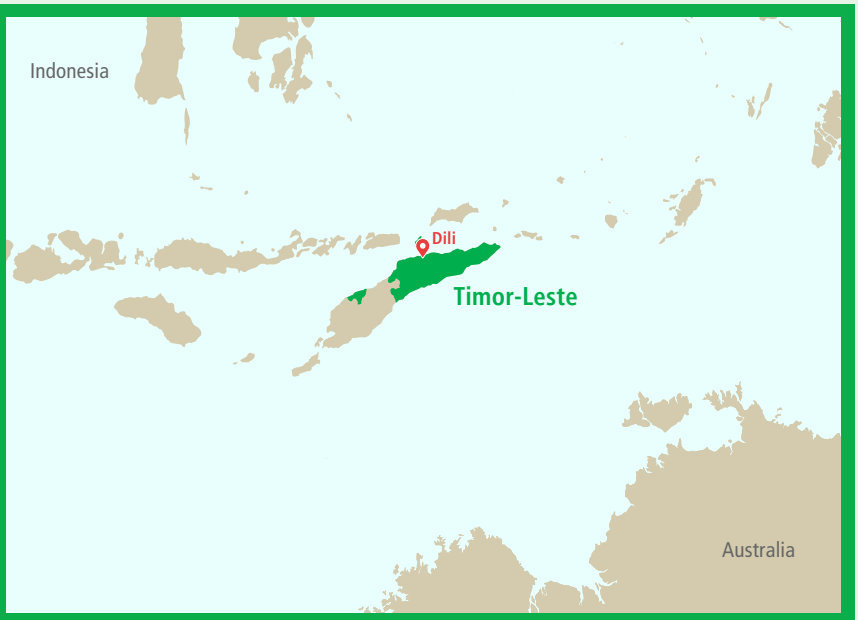
About Timor-Leste

Timor-Leste is a geographically spectacular but sparsely developed country which lies at the furthermost tip of South-East Asia.

It gained independence in 2002 after Indonesian occupation, and before that centuries of colonial rule by Portugal. Utilising the economic benefits generated by oil reserves in the Timor Sea, the country is actively seeking to develop its infrastructure and health systems to befit its status as newly-emerging economy.

Health is a key policy focus in this young country, where more than 60% of the population is under the age of 25, and increasing immunisation rates has been a government priority, actively supported by Gavi, since 2012. However, given that those who live outside the major towns and cities are scattered over small and often remote settlements, it has not been an easy task to make sure everyone has access to the benefits of immunisation and other health services. The approach that has been adopted in Timor-Leste – delivering health care directly to the households – is starting to show success.

Every day, small teams of health workers fan out from their village- and town-based clinics and health centres to visit small settlements and communities. They knock on each door, check who is living there and whether they have any unmet health needs. Children's vaccination records are examined and any missed immunisations given there and then. As a result of this kind of outreach, the Government expects immunisation rates and access to healthcare to improve across this small and largely inaccessible country.



This health outreach programme, Saude na Familia (Health for the Family), is the brain child of Rui Maria de Araújo, the then Prime Minister, and former Minister of Health, of Timor-Leste. Mr de Araújo is a man who likes to lead from the front; each week, he joins staff members from his ministry as they conduct their house-to-house visits. In one house, the Minister finds a newborn baby, not yet one month old. Local custom dictates that women should give birth at home ("by the fire") and that children should not go outside until they are at least one month old. Timor-Leste's outreach programme means that babies need not miss out on their vaccinations just because they cannot be taken to the health clinic.

Getting the logistics right

In countries like Timor-Leste, getting the right vaccines to the right places is all about planning. Dr Maria Odete Belo knows this more than most – her job is to manage the central logistics and distribution warehouse for health supplies in Dili. From her warehouse, medicines and vaccines are sent throughout Timor-Leste.

On her visit to Sri Lanka, Dr Belo saw first-hand how the country manages its health supply system and is now thinking about how some of these approaches could work in Timor-Leste. She takes up the story: "Here in Timor-Leste, we use a pull system – we distribute based on the needs of the health facilities. So we just sit and wait and when they submit their requisition, we make a distribution. Also, we don't bring the items directly to the health facility. They are the ones who collect the items."

"In Sri Lanka they use a push system. They know what the health facility needs, they have their schedule and they don't need another requisition, they know already the numbers of vaccines and other commodities that will be needed."

Thanks to the twinning partnership, Timor-Leste is now considering a similar push system to the one used in Sri Lanka.

Community health centre in Ermera district, Timor-Leste
Gavi/2016/Antti Helin

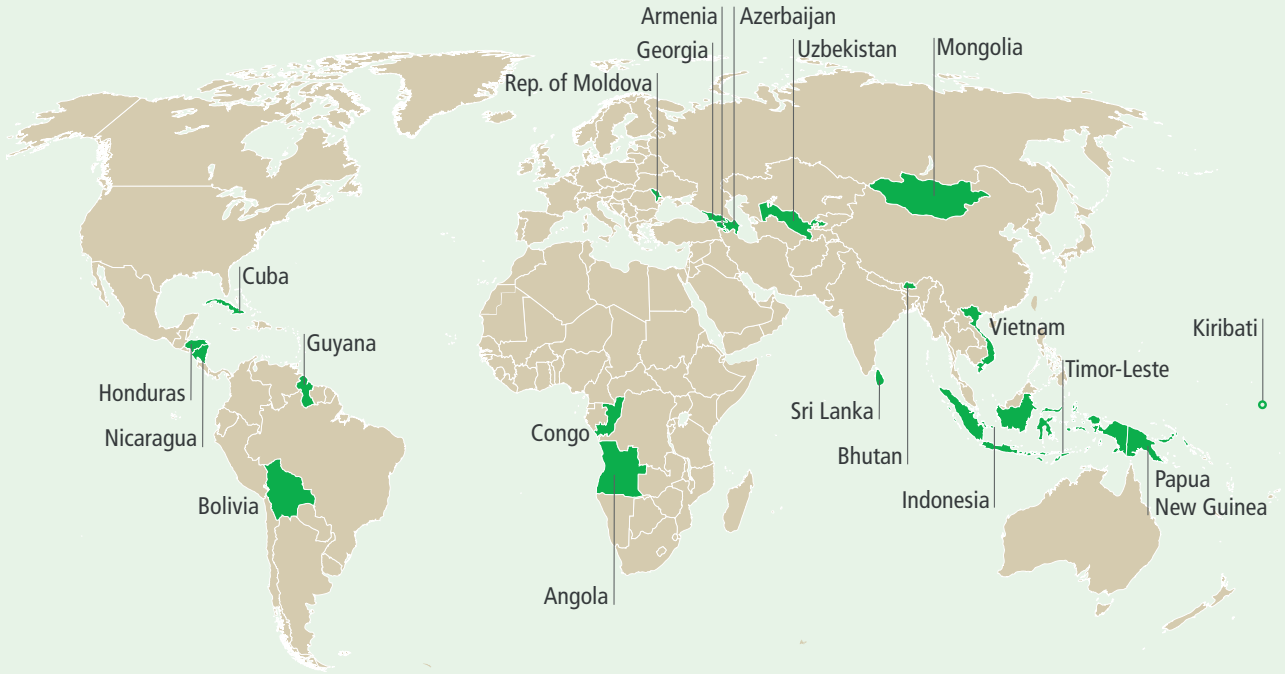
Making the transition

Gavi support has helped Timor-Leste improve its immunisation services and introduce new vaccines, including pentavalent in 2012 and inactivated polio vaccine in 2015. At the end of 2017, the country transitioned out of Gavi support.

Every Gavi-supported country will one day fund its own immunisation programme. The challenge is to ensure that countries prepare for their transition early and in a sustainable manner, so that immunisation can continue to protect children from infectious diseases after Gavi support ends.

While twinning may be the right approach in some countries such as Timor-Leste, others may benefit from different strategies as they get ready to take on full funding of their vaccination programmes.

20 countries set to transition by 2020



Note that transition dates may change due to changes in the eligibility status of specific countries.

Lessons in transition: the Honduras experience

Dr Edna Yolani Bátres was Minister of Health in Honduras when the country completed its transition from Gavi support in 2016. Here she reflects on her country's experience of transition and shares lessons learned.

How would you describe the transition process for Honduras?

Transition for Honduras was very successful because we were involved in planning from the beginning. During the transition, one of our main goals was to introduce the human papillomavirus (HPV) vaccine. For us, this was very important because cervical cancer is the second cause of death in women. During the introduction year, Gavi financed 50% of the doses while we paid for the other 50%. From the second year onwards, 100% of the doses are financed by the Government.

How did Honduras decide to introduce the HPV vaccine after transitioning out of support?

That was something we always wanted to do but we didn't have the resources. When this vaccine came to the market, it was too expensive for Honduras. The only families who vaccinated their girls, were those who could afford to pay about US$ 100 in the private sector. But this cancer is more frequent among the poor, so for us it was a dream come true – and it is something I am proud to have done under my leadership.

How successful was the HPV vaccine introduction and what were the main challenges?

It worked very well because we did it in the months when the schools were open – in the public schools first and then the private schools. The challenges we had were not in the public sector; it was in the private schools. Some parents had read that this vaccine wasn't a good experience in other countries. But overall, we had very good acceptance from the population of this vaccine.

Gavi/2018/Jacques Schmitz

What did Honduras learn from the process and what role did Gavi support play?

What did we learn that I can share with other countries? Just because we are in transition it doesn't mean that our work with Gavi is over. In transition we can still do a lot of work, and we can still introduce new vaccines. And I think one of the lessons is that Gavi's work and communication with the transitioned country should never end.

How does Honduras intend to work with Gavi in the future as a transitioned country?

I hope Gavi can share our good experience and our voice with other countries. In Honduras, we have some big hospitals that are sentinels, which report to us on their challenges and their successes. I like to think Honduras can be a sentinel country for all transitioning countries.

See also Transitioning **p28–29**

Data

Good immunisation needs good data

How Nigeria is overcoming the challenges of acquiring accurate vaccine coverage information

Gavi/2013/Adrian Brooks

How can we reach the huge number of children who are still missing out on basic vaccinations when we do not even know how many there are or where they live?

That is the challenge facing Nigeria, Africa's most populous nation. A large country of outstanding beauty and diverse landscapes, Nigeria embodies some of the most significant challenges that Gavi and its partners face when trying to ensure that all vulnerable children are vaccinated against infectious disease.

It is estimated that Nigeria is home to over 3.9 million underimmunised children – more than any other country in the world. Many of these children live in hard-to-reach places, far from towns and cities, and are largely unknown to healthcare providers.

The country also has some of the greatest inequities in immunisation coverage. For example, there is a huge disparity in routine vaccination coverage between the southwest city of Lagos, which has 80% coverage, and the northwest city of Sokoto, where just 3% of children receive basic vaccines.[a] Inequities based on income levels are also very much in evidence, with a 73 percentage point difference in coverage between the wealthiest and poorest sections of society.[b]

However, these figures are at best educated guesses. That is because in the past Nigeria has lacked the capacity to acquire and report reliable population and health statistics, and has yet to provide correct information on the number of children it immunises each year. There is an urgent need to accurately report the health and immunisation status of the whole population, so that health services can be designed and planned to meet their true needs.

Nigeria is home to over 3.9 million underimmunised children – more than any other country in the world

Child immunisation records in Nigeria

Gavi/2013/Adrian Brooks

a – 2016 multiple indicator cluster survey and national immunisation survey results.
b – Successfully transitioning Nigeria from Gavi support.
Report to the Gavi Board. 6–7 June 2018, page 3.

Identifying the known unknowns

Population estimates for Nigeria vary from 170 million up to 198 million – a difference of 28 million. There are also large differences in reported vaccine coverage rates. "Historically, the administrative reporting of routine immunisation coverage in Nigeria has been high," says Dr Dorothy Nwodo, Director of Disease Control and Immunization at Nigeria's National Primary Health Care Development Agency, based in Abuja. "But survey reports would indicate very poor routine immunisation coverage."

Family in remote location
Gavi/2013/Adrian Brooks

In 2017, matters came to a head. Administrative reports suggested that during the previous year, Nigeria had achieved 98% coverage with the third dose of pentavalent vaccine, which protects against diphtheria, tetanus, pertussis (DTP), hepatitis B and *Haemophilus influenzae* type b. That would have meant that Nigeria was far exceeding WHO's region-wide target for third-dose DTP vaccine coverage, which is 90% by 2020.

Alternative estimates of immunisation coverage, based on multiple indicator cluster surveys and national immunisation surveys, were much lower – just 33%. The disparity is thought to have been caused by some regions falsifying data in a bid to meet strategic targets.

The lack of reliable data in the country is not surprising. "Nigeria has a poor health system with poor services," says Dr Nwodo. The country lacks the infrastructure required to provide primary healthcare, including immunisation, she says, and has struggled to coordinate services. This lack of front-line services makes it difficult for Nigeria to consistently acquire information about the health of its people.

"The health centres and delivery points often lack properly trained personnel, funding and equipment to capture data," adds Dr Omotayo Bolu, Director for Immunization Programs at the Nigeria Country Office of the Centers for Disease Control and Prevention (CDC) in Abuja. "Healthcare workers often do not understand the importance of collecting data while, in some parts of the country, a lack of security prevents any data from being captured at all."

Not knowing the size of the total population does not help. "The current projected national census figure is unrealistic, and not ideal for accurate planning," says Dr Nwodo. "There is also poor data reporting from rural areas compared to urban areas."

2017: a turning point

Although 2017 marked the end of a recession caused by a collapse in oil prices, Nigeria's economic growth remains modest. Relative to other countries, the majority of the population has poor health outcomes and continues to suffer the consequences of outbreaks of diseases like yellow fever, meningitis and cholera.

In September, a major outbreak of yellow fever, centred around Ifelodun in western Nigeria, proved to be a decisive event. Following the outbreak, the Nigerian Government announced its plans to vaccinate 25 million people against yellow fever in the largest vaccination drive the country has ever seen.

This ambitious campaign is a testament to Nigeria's intention to take ownership of its immunisation programmes, a move triggered both by the scale of recent disease outbreaks and the debate sparked by the discrepancies in reported coverage rates for pentavalent vaccine. "In the past, the Government always seemed to align with the high administrative coverage. The acceptance of the 2016 survey results by the current leadership of the National Primary Health Care Development and the Federal Ministry of Health is a demonstration of the commitment of the current Government to address outstanding routine immunisation-related issues," says Dr Nwodo.

This acceptance of the survey data led to direct action. On 17 June 2017, Nigeria's Government declared a state of public health concern due to the numbers of people lacking protection against infectious disease. "The country had to declare immunisation as an emergency to review the process of service delivery and vaccine logistics and improve routine data quality," explains Dr Bolu.

Then on 4 July, the Government established the new National Emergency Routine Immunization Coordination Centre (NERICC). "This was done to rapidly revamp the routine immunisation performance of the country," says Dr Nwodo.

Nigerian nurse with immunisation register
Gavi/2013/Adrian Brooks

See also Data quality **p24**

Harnessing mobile technology to plug data gaps

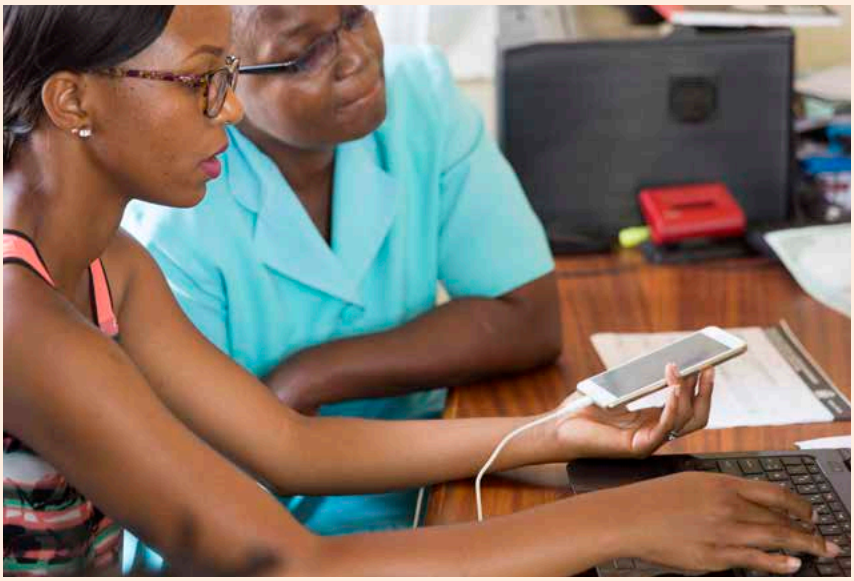
Improving the data management systems that collate information on how many people have been vaccinated has become a high priority. In December 2017, Nigeria piloted an innovative way to track immunisation statistics in two regions in Nasarawa State in the north of the country.

The pilot scheme takes full advantage of mobile phone technology. Each of the 55 participating health centres was given a simple-to-use, durable mobile phone with a long battery life and a mobile SIM data card. The card carries a phone number which identifies the health centre to a central computer server.

When a child or adult attends an immunisation session, health workers select the appropriate symbol on the mobile device that corresponds to the vaccine and dose given. They then relay that information via text message, using basic cell phones, to the central server – allowing all vaccinations to be accurately logged and recorded in real time. Gavi and its partners are playing a key role in working with phone companies to upgrade the basic mobile phones to smartphones, and to introduce an app to send the messages.

The SMS-based system has revolutionised the reporting of immunisation data in Nigeria. Within the first month of its introduction, 72% of health facilities offering routine immunisation were sending in information. Preliminary results have made it possible to track each conducted session and the vaccines used relative to the children immunised on a weekly basis. This has allowed immediate decision-making to improve programmes.

National immunisation data is centrally stored in Nigeria's District Health Information System (DHIS2), which is used by the Expanded Programme on Immunization to measure progress towards its overall goals. The immediate transmission of accurate data allows the DHIS2 to display real-time charts and graphs, and to conduct a daily analysis of the data. This means that health professionals working at state and district levels are able to quickly monitor and adjust their immunisation programmes to real-time needs. The data is shared monthly with NERICC, which helps guide the project's implementation.



Using the DHIS2 health information system

Norad/2017

"The SMS component complements the DHIS2. Having data entered in real time significantly reduces the risk of falsification and errors," says Dr Bolu. "SMS reporting also ensures data from service delivery points is received promptly and can guide quick decision-making. However, it should not detract from the more in-depth national DHIS2 data, which is delivered monthly."

"The pilot is already showing the gaps in the current reporting system and contributing to improved data quality from the health facilities," adds Dr Nwodo. The scheme, initially funded by the CDC across 18 states, has proved so successful that Nigeria will now extend the approach to more than 26,000 health facilities nationally.

Looking to the future

By the end of 2017, Nigeria had rolled out the DHIS2 nationwide with support from the Bill & Melinda Gates Foundation and the CDC. The system now encourages all data to be electronically recorded and transmitted directly to the DHIS2 platform, rather than through the previous data management tool. Steps were also taken to implement quarterly vaccination surveys, known as routine immunisation lot quality assurance surveys, in 36 states. These surveys are helping to establish accurate baseline data, so that Nigeria can measure improvements in the quality of its routine immunisation programme over time.

Following this progress, by the end of 2017 the Alliance had begun a process of intensive engagement with authorities in Nigeria – notably with the Nigeria Primary Health Care Development Agency – to develop a 10-year National Strategy for Immunisation and Primary Health Care System Strengthening, which will run from 2018 until 2028.

In the wake of these recent achievements, and given the unique challenges the country faces, the Gavi Board will consider extending support to Nigeria for another 10 years.

By taking action to make drastic improvements to the quality and reliability of its immunisation data, Nigeria is working hard to meet its targets for vaccine coverage. If it meets them, it will be able to prevent an estimated 1 million or more deaths by 2028. That, in turn, will help to radically reduce the size of the world's largest remaining national cohort of underimmunised children in the world.

Vaccinated children in Nigeria together with their mothers and health workers

Gavi/2013/Adrian Brooks

Annexes

Note: due to rounding, numbers presented throughout these annexes may not add up precisely to the totals and percentages may not exactly reflect the absolute figures.

1 Contributions to Gavi

as of 31 December 2017 (US$ millions)

Cash received by Gavi

Donors	2017	Total 2000–2017
Australia	15.5	323.9
Canada	92.5	440.9
China	1.0	3.0
Denmark		45.7
European Commission (EC)	7.8	114.9
France		255.4
Germany	149.7	489.3
India		4.0
Ireland	3.5	52.0
Italy	14.3	18.6
Japan	19.2	91.5
Kingdom of Saudi Arabia	5.0	7.5
Luxembourg	0.9	13.6
Netherlands	59.3	462.9
Norway	159.4	1,436.9
Principality of Monaco	0.1	0.1
Republic of Korea	4.0	15.0
Spain		43.2
State of Qatar	2.0	4.0
Sultanate of Oman	0.6	1.2
Sweden	33.5	447.3
Switzerland		1.6
United Kingdom	282.1	2,209.2
United States of America	275.0	1,889.5
Donor governments and the European Commission total:	**1,125.5**	**8,370.5**
Alwaleed Philanthropies	0.2	0.4
Bill & Melinda Gates Foundation	320.0	3,099.4
The Children's Investment Fund Foundation (UK)		31.8
China Merchants Charitable Foundation	0.5	0.5
Comic Relief	2.7	25.1
ELMA Vaccines and Immunization Foundation		2.0
His Highness Sheikh Mohammed bin Zayed Al Nahyan	5.0	38.0
International Federation of Pharmaceutical Wholesalers (IFPW)	0.2	0.4
"la Caixa" Foundation	2.6	31.7
LDS Charities	1.0	9.2
Lions Clubs International Foundation (LCIF)	9.5	30.0
OPEC Fund for International Development (OFID)		1.1
Red Nose Day Fund	2.0	5.2
Unilever[a]	1.1	2.1
Other private donors[b]	0.2	29.1
Foundations, organisations and corporations total:	**345.0**	**3,306.0**
Subtotal:	**1,470.5**	**11,676.5**
AMC proceeds[c]	34.7	1,111.5
IFFIm proceeds[d]		2,575.7
Total:	**1,505.2**	**15,363.7**

Notes:

a – Unilever provides resources to Gavi through a leveraged partnership project.

b – Includes contributions from: A&A Foundation (US$ 1.5m), Absolute Return for Kids (US$ 1.6m), Anglo American plc (US$ 3.0m), Dutch Postcode Lottery (US$ 3.2m) and JP Morgan (US$ 2.4m), in addition to other private sector donors (some contributions were initially paid to the GAVI Campaign).

c – Cash transfers from the World Bank to Gavi.

d – Cash disbursements from the World Bank to the GFA (2006–2012) and to Gavi (2013–2017).

Cash received by Gavi

in support of Gavi for its role in supporting the Polio Eradication and Endgame Strategic Plan (2013–2020)

Donors	2017	Total
Norway	22.2	100.2
United Kingdom	11.5	34.8
Governments total:	**33.6**	**135.0**
Bill & Melinda Gates Foundation	40.0	196.6
Private contributions total:	**40.0**	**196.6**
Total:	**73.6**	**331.6**

Innovative finance mechanisms: AMC and IFFIm

AMC commitments		Total 2009–2020
Italy		635.0
United Kingdom		485.0
Canada		200.0
Russian Federation		80.0
Bill & Melinda Gates Foundation		50.0
Norway		50.0
Total:		1,500.0

IFFIm commitments[a]	Amount (in millions)[b]	Amount (equivalent in US$ millions)[c]
United Kingdom	GBP 1,614.7	2,731.2
France	EUR 1,375.0	1,763.3
Italy	EUR 491.2	592.8
Norway	NOK 1,473.8 USD 26	245.6
Australia	AUD 285.8	270.2
Spain	EUR 186.3	222.7
Netherlands	EUR 78.0 USD 66.4	168.5
Sweden	SEK 270.4	34.4
South Africa	USD 19.7	18.2
Total:		6,046.9

Notes:

a – Brazil made a new pledge to IFFIm in 2011. Negotiations are currently under way to formally sign this grant agreement.

b – Amount (to be) paid, in the currency of payment.

c – Non-US$ contributions are expressed in US$ equivalents based on the actual foreign exchange rate at the time of payment for contributions received through 2017 and estimated using the foreign exchange rates at the time of signing the respective donor grant agreements for contributions to be received from 2018 onwards.

Country co-financing commitments

	2017	2000–2016
Co-financing[a]	136.0	651.0

Notes:

a – These amounts are subject to change as a result of i) payments against past defaults ii) payments against co-financing obligations of fiscally aligned countries.

Source: Gavi, the Vaccine Alliance, 2018

2 Governance structure

as of 31 December 2017

The Gavi Board

There are 28 seats on the Board:

- 4 permanent members representing UNICEF, WHO, the World Bank, and the Bill & Melinda Gates Foundation
- 5 representing developing country governments
- 5 representing donor country governments
- 1 member each representing civil society organisations, the vaccine industry in developing countries, the vaccine industry in industrialised countries, and research and technical health institutes (4 in total)
- 9 independent individuals with a range of expertise
- The CEO of Gavi (non-voting)

Independent members

Ngozi Okonjo-Iweala, *Board Chair*
Gunilla Carlsson, *Board Vice Chair*
Helen Rees
David Sidwell
William Roedy
Margaret (Peggy) Hamburg
Yifei Li
Richard Sezibera
Stephen Zinser

Institutions

WHO
Soumya Swaminathan

UNICEF
Shanelle Hall

The World Bank
Tim Evans

The Bill & Melinda Gates Foundation
Orin Levine

Constituencies

Developing country government representatives

Constituency 1
Bahar Idriss Abu Garda (Sudan)

Constituency 2
Myint Htwe (Myanmar)

Constituency 3
Edna Yolani Batres (Honduras)

Constituency 4
Raymonde Goudou Coffie (Côte d'Ivoire)

Constituency 5
Ummy Ally Mwalimu (United Republic of Tanzania)

Donor government representatives

USA/Australia/Japan/Republic of Korea
Blair Exell (Australia)

United Kingdom/Qatar
Daniel Graymore (United Kingdom)

Canada/Italy/Spain
Amy Baker (Canada)

Germany/France/Luxembourg/ European Commission/Ireland
Jan Paehler (European Commission)

Norway/Netherlands/Sweden
Reina Buijs (Netherlands)

Industrialised country vaccine industry
Susan Silbermann (Pfizer)

Developing country vaccine industry
Sai Prasad (Bharat Biotech)

Civil society organisations
Clarisse Loe Loumou (Alternative Santé, Cameroun)

Research and technical health institutes
Oyewale Tomori (formerly Redeemer's University, Nigeria, and the Nigerian Academy of Science)

Non-voting member
Seth Berkley, CEO Gavi, the Vaccine Alliance

Other Gavi-related governance structures

The International Finance Facility for Immunisation (IFFIm) Company

René Karsenti, *Chair*
President, the International Capital Market Association (ICMA)

Cyrus Ardalan
Chairman, Citigroup Global Markets Limited

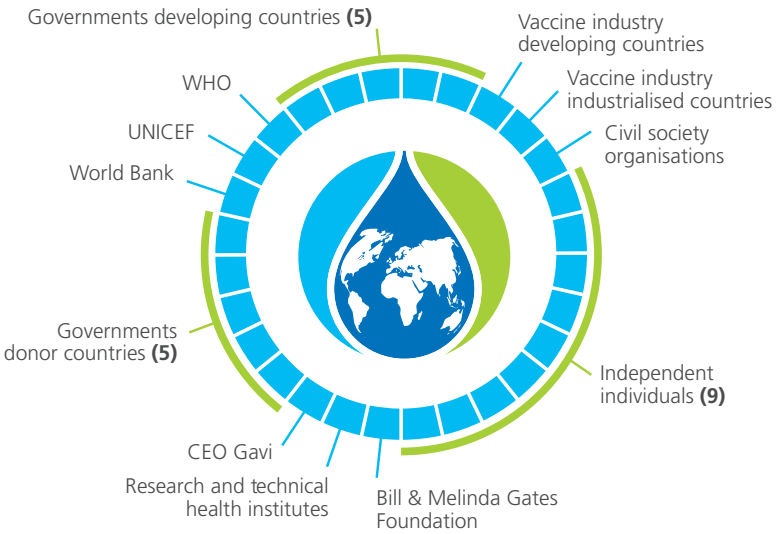
Marcus Fedder
Former Vice Chair, TD Securities

Christopher Egerton-Warburton
Partner, Lion's Head Capital Partners

Fatimatou Zahra Diop
Former Secretary General, Central Bank of West African States (BCEAO)

Doris Herrera-Pol
Former Global Head of Capital Markets, the World Bank

Governance structure



Source: Gavi, the Vaccine Alliance, 2018

3 Contributions pledged to Gavi[a] includes pledges as of 31 December 2017 (US$ millions)

Donors	2000–2010 Direct contribution	Matching Fund	AMC	IFFIm[b]	Total	As % of grand total[c]	2011–2015 Direct contribution	Matching Fund	AMC	IFFIm[b]	Total	As % of grand total[c]	2016–2020 Direct contribution	Matching Fund	AMC	IFFIm	Total	As % of grand total[c]
Australia	29				29	<1%	242			28	270	4%	162			94	255	3%
Brazil[d]																3	3	<1%
Canada	152		125		277	7%	120		75		194	3%	410				410	4%
China													5				5	<1%
Denmark	32				32	<1%	13				13	<1%						
European Commission (EC)	58				58	1%	35				35	<1%	258				258	3%
France[e]	19			192	211	5%	127			306	433	6%	109			451	561	6%
Germany	22				22	<1%	186				186	3%	716				716	8%
India							3				3	<1%	1				1	<1%
Ireland	30				30	<1%	15				15	<1%	18				18	<1%
Italy			158	107	265	6%			266	152	418	6%	123		211	159	492	5%
Japan							54				54	<1%	95				95	1%
Kingdom of Saudi Arabia													23				23	<1%
Luxembourg	6				6	<1%	5				5	<1%	5				5	<1%
Netherlands[f]	216			14	230	5%	149			72	220	3%	211	12		83	306	3%
Norway	526		2	41	569	14%	612		48	94	754	10%	786			111	897	10%
Principality of Monaco													1				1	<1%
Republic of Korea	0.4				0.4	<1%	7				7	<1%	12				12	<1%
Russian Federation			8		8	<1%			40		40	<1%			32		32	<1%
South Africa				4	4	<1%				4	4	<1%				4	4	<1%
Spain	43			58	101	2%				51	51	<1%				54	54	1%
State of Qatar													10				10	<1%
Sultanate of Oman													3				3	<1%
Sweden	123			10	132	3%	255			11	266	4%	186			11	198	2%
Switzerland													2				2	<1%
United Kingdom[g]	137		22	153	313	7%	1,424	61	317	475	2,277	31%	1,378		146	920	2,445	27%
United States of America[h]	647				647	15%	733				733	10%	800				800	9%
Donor governments and the European Commission total	2,039		316	578	2,933	70%	3,980	61	746	1,192	5,979	80%	5,313	12	388	1,891	7,604	83%
Alwaleed Philanthropies													1				1	<1%
Bill & Melinda Gates Foundation[i]	1,213		20		1,233	29%	1,237	50	30		1,317	18%	1,475	75			1,550	17%
The Children's Investment Fund Foundation (UK)								32			32	<1%						<1%
China Merchants Charitable Foundation														2			2	<1%
Comic Relief								20			20	<1%		8			8	<1%
ELMA Vaccines and Immunization Foundation								2			2	<1%						
Girl Effect[j]														4			4	<1%
His Highness Sheikh Mohammed bin Zayed Al Nahyan							33				33	<1%	5				5	<1%
International Federation of Pharmaceutical Wholesalers (IFPW)														1			1	<1%
"la Caixa" Foundation	16				16	<1%		11			11	<1%		5			5	<1%
LDS Charities								7			7	<1%	2				2	<1%
Lions Clubs International (LCIF)								15			15	<1%		15			15	<1%
OPEC Fund for International Development (OFID)							1				1	<1%						
Red Nose Day Fund							1				1	<1%	0	5			5	<1%
Unilever[k]														3			3	<1%
Other private donors[l]	12				12	<1%	5	12			17	<1%	3				3	<1%
Foundations, organisations and corporations total[m]	1,241		20		1,261	30%	1,277	148	30		1,455	20%	1,486	118			1,604	17%
Grand total:	3,280		336	578	4,194	100%	5,257	209	776	1,192	7,434	100%	6,799	130	388	1,891	9,208	100%

Direct contribution	Matching Fund	AMC	2021–2037 IFFIm	Total	As % of grand total[c]	Donors
			149	149	6%	Australia
			17	17	<1%	Brazil[d]
						Canada
						China
						Denmark
						European Commission (EC)
			814	814	34%	France[e]
						Germany
						India
						Ireland
			175	175	7%	Italy
						Japan
3				3	<1%	Kingdom of Saudi Arabia
						Luxembourg
						Netherlands[f]
						Norway
						Principality of Monaco
						Republic of Korea
						Russian Federation
			6	6	<1%	South Africa
			60	60	2%	Spain
						State of Qatar
						Sultanate of Oman
			3	3	<1%	Sweden
						Switzerland
			1,183	1,183	49%	United Kingdom[g]
						United States of America[h]
3			2,406	2,409	100%	Donor governments and the European Commission total
						Alwaleed Philanthropies
						Bill & Melinda Gates Foundation[i]
						The Children's Investment Fund Foundation (UK)
						China Merchants Charitable Foundation
						Comic Relief
						ELMA Vaccines and Immunization Foundation
						Girl Effect[j]
						His Highness Sheikh Mohammed bin Zayed Al Nahyan
						International Federation of Pharmaceutical Wholesalers (IFPW)
						"la Caixa" Foundation
						LDS Charities
						Lions Clubs International (LCIF)
						OPEC Fund for International Development (OFID)
						Red Nose Day Fund
						Unilever[k]
						Other private donors[l]
						Foundations, organisations and corporations total[m]
3			2,406	2,409	100%	**Grand total**

Notes:

a – Some contributions may be received by Gavi in years different to those for which the pledges were made.

b – A number of the "US$ equivalent values" of actual IFFIm donor contributions received between 2006 and 2015 have been updated to reflect information received from the IBRD at the end of 2016. The total value of changes made is +US$ 4.5 million representing 0.25% of the total contributions received during this period (US$ 1.77 billion); changes at country level are also relatively minor.

c – The percentages in this column pertain to each donor's share of the total amount pledged for the period, rather than each donor's share of the expected need for the period.

d – In June 2011, Brazil pledged US$ 20 million to IFFIm. Grant agreement discussions are ongoing and hence proceeds cannot be attributed at the present time.

e – The Agence Française de Développement (AFD, the French Development Agency), Gavi, the Vaccine Alliance and the Bill & Melinda Gates Foundation signed an innovative partnership worth €100 million which will contribute to funding in the 2016–2020 period. The partnership aims to increase vaccine coverage in six French-speaking countries of the Sahel region: Burkina Faso, Chad, Mali, Mauritania, the Niger and Senegal.

f – As at 31 December 2017, €3.0 million (US$ 3.7 million) of the total €10 million Matching Fund contributions pledged by the Netherlands had yet to be matched by other and/or private sector donor contributions.

g – As at 31 December 2017, all of the UK's £38.1 million Matching Fund contributions (US$ 61 million) have been matched by other and/or private sector donor contributions.

h – The US$ 1.0 billion pledge announced at the 2015 Berlin replenishment meeting by the USA is for the period 2015–2018 and includes US$ 800 million for the 2016–2018 period. The United States Government has also provided an additional US$ 20 million to Gavi to be used for an Ebola vaccine stockpile once a licensed vaccine becomes available.

i – As at 31 December 2017, of the US$ 125 million Matching Fund contribution pledged by the Bill & Melinda Gates Foundation, a total of US$ 46.3 million had yet to be matched by other and/or private sector donor contributions.

j – Girl Effect is an investor and implementer in Gavi's mission to drive increased uptake of the HPV vaccine.

k – Unilever provides resources to Gavi through a leveraged partnership project.

l – Includes contributions from: A&A Foundation (US$ 1.5 million), Absolute Return for Kids (US$ 1.6 million), Anglo American plc (US$ 3.0 million), Dutch Postcode Lottery (US$ 3.2 million) and JP Morgan (US$ 2.4 million), as well as contributions from several other smaller private sector donors.

m – In-kind contributions are not included in the total for foundations, organisations and corporations. As of 31 December 2017, the following organisations have contributed (or pledged) in-kind contributions: Deutsche Post DHL Group, Girl Effect, Google-Nexleaf Analytics, IFPW, Lions Clubs International Foundation, Philips, Unilever, UPS and Vodafone.

General notes regarding reporting of US$ equivalents (for contributions made to Gavi in currencies other than US$):

Direct contributions (including Matching Fund)

Received contributions: non-US$ contributions for 2000–2017 are expressed in US$ equivalents using the exchange rates on the dates of receipt. For 2014, 2015, 2016 and 2017, where contributions were hedged to mitigate currency risk exposure, these have been expressed using the rates applicable to the hedge agreement.

Future contributions: non-US$ direct contribution and Matching Fund pledges for 2018 and beyond are expressed in US$ equivalents using the applicable "forecast rates" from Bloomberg as at 31 December 2017 or using the rates applicable to any hedge agreement in place.

IFFIm contributions

Received contributions: non-US$ contributions for 2000–2017 are expressed in US$ equivalents as confirmed by the IBRD (World Bank).

Future contributions: non-US$ contributions for 2018 and beyond are expressed in US$ equivalents as follows:

> Where the contribution agreement has been signed: contributions are expressed in US$ equivalents using the exchange rates at the time of signing the respective donor grant agreements and

> Where the contribution agreement has not yet been signed: contributions are expressed in US$ equivalents using the applicable "forecast rates" from Bloomberg as at 31 December 2017.

These future contributions have not been reduced by a notional 3% provision to allow for any potential reduction arising from the High-Level Financing Condition of the IFFIm Finance Framework Agreement.

Source: Gavi, the Vaccine Alliance, 2018

4 Commitments for country programmes 2000–2022[a]

as of 31 December 2017 (US$ millions)

Country	New and underused vaccine support	Health system strengthening support	Immunisation services support	Operational support	Injection safety support	Vaccine introduction grant	Civil society organisation support[b]	Human papillomavirus vaccine demonstration cash support	Product switch grant	Transition grant	Ebola EPI recovery grant	Cold chain equipment optimisation platform	Total
Afghanistan	205.5	99.6	14	3.6	1.7	3.5	3.6		0.4				331.8
Albania	2.1				0.1	0.3							2.5
Angola	99.4	5.8	3		1.3	3.7				1.5			114.7
Armenia	4.7	0.3	0.1		0.1	0.5		0.2	0	0.6			6.4
Azerbaijan	12.2	0.6	0.7		0.2	0.2							13.9
Bangladesh	503.3	47.6	23.3	34	6.1	11		0.4					625.8
Benin	98	9.3	0.2	5.1	0.4	1.3		0.2					114.4
Bhutan	1.2	0.2			0	0.3				0.2			1.9
Bolivia (Plurinational state of)	24.9	5.4	0.3		0.9	0.8				1.2			33.5
Bosnia & Herzegovina	2.1				0.1	0.1							2.3
Burkina Faso	210.9	21.2	9.7	7.5	0.9	3.6		0.2					254
Burundi	94.2	24.6	3.7	2.6	0.4	1.6	0.5	0.2	0.1				128
Cambodia	56.1	28.4	2	6.9	0.6	1.5		0.2					95.8
Cameroon	181.9	30.4	8	8.3	1	3.7		0.2	0.3			2.9	236.7
Central African Republic	27.4	12.2	1.9	2.3	0.1	0.6							44.6
Chad	49.9	5.7	2.6	8.9	0.4	1.2							68.8
China	22				15.9	0.8							38.7
Comoros	1.5	1.8	0.1		0	0.3							3.7
Congo	20.4	5.2	1.7		0.2	0.8				0.4			28.7
Côte d'Ivoire	169.9	18.2	8.9	14.7	1.6	3.6		0.2	0.2				217.4
Cuba	1	2.4			0.4	0.1				0.2			4
Democratic People's Republic of Korea	26.9	35.6	2.2		0.7	0.6							66.1
Democratic Republic of the Congo	590.6	201.4	25.8	31.9	2.7	8.2	9.8		0.8			22.4	893.6
Djibouti	5.2	3.4	0.2		0	0.4						0.3	9.6
Eritrea	25	9	0.4	1	0.1	0.7			0			1	37.4
Ethiopia	893.7	218.5	23.4	57.4	2.7	11.6	3.3	0.2				20.9	1,231.8
Gambia	29	4.7	0.7	1.4	0.1	1.2		0.2	0				37.3
Georgia	4.4	0.4	0.1		0.1	0.4		0.2		0.6			6.2
Ghana	250.9	28	5.3	10	0.9	3.4	0.8	0.2					299.4
Guinea	33.2	28.6	2.9	2.3	0.3	0.6					6.1	8.7	82.8
Guinea-Bissau	8.7	1.4	0.5	0.8	0.1	0.5							12
Guyana	3.6		0.1			0.5				0.4			4.5
Haiti	30.7	3.3	1.3		0.4	1						5.9	42.5
Honduras	31	9.2	0.1		0.5	0.6				0.4			41.7
India	622	207		8.5	18.4	0.4							856.4
Indonesia	116.3	24.8	12.6		9.9	11.6	3.9	0.2					179.3
Kenya	429.7	28.7	6.4	14	1.1	4.3		0.3				4.1	488.7
Kiribati	0.3					0.3							0.6
Kyrgyzstan	23.1	5.8	0.8		0.2	0.4							30.3
Lao People's Democratic Republic	27.2	13.8	1.4	1	0.3	1		0.2		1.5			46.4
Lesotho	5.9	2.7	0.1	0.6	0.1	0.6							10
Liberia	31.3	18.8	2.2	0.5	0.4	0.6		0.2			2.8	1.2	57.9
Madagascar	172.4	27.6	4.1		0.6	2.3		0.2				3.6	210.7
Malawi	224.6	52.2	2	5.8	0.7	3.3		0.2	0.2			4.5	293.3
Mali	229.7	24.7	5	2.2	0.7	1.8		0.2					264.2
Mauritania	28.8	5.9	0.7	1.9	0.2	0.7							38.1
Mongolia	5.9	0.5	0.5		0.1	0.2							7.2
Mozambique	200.6	26.5	1.7	7.9	0.8	4.7		0.2	0.3				242.7
Myanmar	144.4	84.8	7.7	20.5	2.1	6.5						3.3	269.2

Country	New and underused vaccine support	Health system strengthening support	Immunisation services support	Operational support	Injection safety support	Vaccine introduction grant	Civil society organisation support[b]	Human papillomavirus vaccine demonstration cash support	Product switch grant	Transition grant	Ebola EPI recovery grant	Cold chain equipment optimisation platform	Total
Nepal	110.7	59.7	3.3	2.4	1.2	3.2		0.2					**180.6**
Nicaragua	32.6	3.8	0.3		0.5	0.3				0.8			**38.4**
Niger	157.3	43.6	7.4	3.8	0.9	3.6		0.3	0.2			3	**220**
Nigeria	697.3	38	47.3	114.2	12.6	15.9							**925.3**
Pakistan	921	123.4	48.8	21.7	7.4	15.6	7.6					20.6	**1,166**
Papua New Guinea	26.3	3.3	0.4	1.9		0.8							**32.7**
Republic of Moldova	5				0.1	0.5		0.2		0.8			**6.5**
Rwanda	121.6	17.9	3	4.2	0.4	1.4			0.1				**148.5**
Sâo Tomé and Príncipe	1.6	3.5	0.1	0	0	0.7		0.2					**6.1**
Senegal	108.1	17.5	2.6	8.9	0.6	2.7		0.2					**140.5**
Sierra Leone	70.1	14	2.7		0.3	0.8		0.2			3.8	1.3	**93.2**
Solomon Islands	2.7	2.3		0.1		0.4		0.2					**5.7**
Somalia	14.7	38.8	1.2		0.2	0.7						2.7	**58.3**
South Sudan	15.6	34.4	5.9	4.7	0.2	0.6						1.9	**63.5**
Sri Lanka	23	4.5			0.7	0.9				0.1			**29.2**
Sudan	365.8	52.6	11.2	37.8	1.3	3.9							**472.6**
Tajikistan	23.1	11	2.4		0.3	0.6							**37.5**
Timor-Leste	1.2	3.1				0.2				1.5			**5.9**
Togo	56.1	11.4	3	4	0.3	1.1		0.2	0.1			1.5	**77.6**
Turkmenistan	1				0.2	0.1							**1.2**
Uganda	382	49.8	9.2	4.6	1.2	5.7						6.6	**459.2**
Ukraine	2.7				0.7	0.1							**3.5**
United Republic of Tanzania	466.6	15.9	11.4	13.8	1	10.2		0.2				8.9	**528**
Uzbekistan	66	17.2	0		0.7	2.4				0.2		1.2	**87.8**
Vietnam	121.6	40.7	1.9	14.9	3.2	3.2				3.2		1.6	**190.3**
Yemen	207.1	24	5	7.5	1.2	2.1							**247**
Zambia	174.3	11.6	3.9	4.5	0.7	2.9							**197.8**
Zimbabwe	104.5	7.1	1.5	3.8	0.9	1.7		0.2					**119.7**
Grand total:	**10,263.1**	**2,035.2**	**361.1**	**514.7**	**113.5**	**190.1**	**29.4**	**6.2**	**2.8**	**13.6**	**12.7**	**128**	**13,670.4**

Notes:

a – Commitments represent endorsements of multi-year programme budgets made by the Gavi Board (or Executive Committee) or the Gavi CEO. These endorsements do not constitute a liability to pay but instead send a positive signal that Gavi intends to fund a programme over its entire life span subject to performance and availability of funds.

b – Civil society organisation Type A support is not included as these approvals are not country specific.

General note: values have been adjusted to reflect the final actual amount disbursed.

Source: Gavi, the Vaccine Alliance, 2018

5 Board approvals for country programme expenditure 2000–2018[a]

as of 31 December 2017 (US$ millions)

Country	New and underused vaccine support	Health system strengthening support	Immunisation services support	Operational support	Injection safety support	Vaccine introduction grant	Civil society organisation support[b]	Human papillomavirus vaccine demonstration cash support	Product switch grant	Transition grant	Ebola EPI recovery grant	Cold chain equipment optimisation platform	Total
Afghanistan	187	89.9	14	3.6	1.7	3.5	3.6		0.4				303.7
Albania	2.1				0.1	0.3							2.5
Angola	99.4	5.8	3		1.3	3.7				1.5			114.7
Armenia	4.7	0.3	0.1		0.1	0.5		0.2	0	0.6			6.4
Azerbaijan	12.2	0.6	0.7		0.2	0.2							13.9
Bangladesh	503.3	36.6	23.3	34	6.1	11		0.3					614.8
Benin	98	8.5	0.2	5.1	0.4	1.3		0.2					113.6
Bhutan	1.2	0.2			0	0.3				0.2			1.9
Bolivia (Plurinational State of)	24.9	5.4	0.3		0.9	0.8				1.2			33.5
Bosnia & Herzegovina	2.1				0.1	0.1							2.3
Burkina Faso	173.6	14.5	9.7	7.5	0.9	3.6		0.1					209.9
Burundi	94.2	24.6	3.7	2.6	0.4	1.6	0.5	0.2	0.1				127.9
Cambodia	56.1	18.1	1.8	6.9	0.6	1.5		0.2					85.2
Cameroon	167.8	12.5	8	8.3	1	3.7		0.2	0.3			2.9	204.7
Central African Republic	27.4	10.6	1.6	2.3	0.1	0.6							42.8
Chad	49.9	5.7	2.6	8.9	0.4	1.2							68.8
China	22				15.9	0.8							38.7
Comoros	1.4	1.8	0.1		0	0.3							3.6
Congo	20.4	5.2	1.7		0.2	0.8				0.4			28.7
Côte d'Ivoire	126.2	12.4	8.9	14.7	1.6	3.6		0.2	0.2				167.9
Cuba	1	2.4			0.4	0.1				0.2			4
Democratic People's Republic of Korea	24.7	25.7	2.2		0.7	0.6							53.9
Democratic Republic of the Congo	511.7	167.7	25.8	31.9	2.7	8.2	9.8		0.8			22.4	781
Djibouti	4.4	2.8	0.2		0	0.4						0.3	8
Eritrea	18.1	5.2	0.4	1	0.1	0.7			0			1	26.6
Ethiopia	694.1	172.4	23.4	53.2	2.7	11.6	3.3	0.2				4.7	965.7
Gambia	24.4	1.6	0.7	1.4	0.1	1.2		0.2	0				29.7
Georgia	4.4	0.4	0.1		0.1	0.4		0.2		0.6			6.2
Ghana	234.7	21.1	5.3	10	0.9	3.4	0.8	0.2					276.3
Guinea	30.6	21	2.9	2.3	0.3	0.6					6.1	8.7	72.6
Guinea-Bissau	8.7	1.4	0.5	0.8	0.1	0.5							12
Guyana	3.6		0.1			0.5				0.4			4.5
Haiti	18.6	3.3	1.3		0.4	1						1.6	26.1
Honduras	31	9.2	0.1		0.5	0.6				0.4			41.7
India	551.8	161		7	18.4	0.4							738.6
Indonesia	116.2	24.8	12.6		9.9	11.6	3.9	0.2					179.2
Kenya	406.1	17.6	6.4	14	1.1	4.3		0.3				4.1	454
Kiribati	0.3					0.3							0.6
Kyrgyzstan	16.3	3.1	0.8		0.2	0.4							20.9
Lao People's Democratic Republic	24.2	10.2	1.4	1	0.3	1		0.2		1.5			39.9
Lesotho	5.9	2.1	0.1	0.6	0.1	0.6							9.4
Liberia	25	14.3	2.2	0.5	0.4	0.6		0.2			2.8	1.2	47.2
Madagascar	158.3	17.2	4.1		0.6	2.3		0.2				3.6	186.2
Malawi	184.3	38.4	2	5	0.7	2.6		0.2	0.2			2.4	235.8
Mali	170.4	13.2	5	2.2	0.7	1.8		0.2					193.5
Mauritania	24.1	3.8	0.7	1.9	0.2	0.7							31.4
Mongolia	5.2	0.5	0.5		0.1	0.2							6.6
Mozambique	181.6	17	1.7	7.9	0.8	4.7		0.2	0.3				214.2
Myanmar	106.6	52.8	7.7	20.5	2.1	6.5						2	198.2

Country	New and underused vaccine support	Health system strengthening support	Immunisation services support	Operational support	Injection safety support	Vaccine introduction grant	Civil society organisation support[b]	Human papillomavirus vaccine demonstration cash support	Product switch grant	Transition grant	Ebola EPI recovery grant	Cold chain equipment optimisation platform	Total
Nepal	86.5	38.8	3.3	2.4	1.2	3.2		0.2					**135.5**
Nicaragua	31	3.8	0.3		0.5	0.3				0.5			**36.4**
Niger	124.5	28.3	7.4	3.8	0.9	3.6		0.2	0.2			3	**172**
Nigeria	562.4	38	47.3	114.2	12.6	15.9							**790.5**
Pakistan	921	123.4	48.8	21.7	7.4	15.6	7.6					20.6	**1,166**
Papua New Guinea	26.3	3.3	0.4	1.9		0.8							**32.7**
Republic of Moldova	5				0.1	0.5		0.2		0.8			**6.5**
Rwanda	121.6	15.9	3	4.2	0.4	1.4			0.1				**146.6**
São Tomé and Príncipe	1.4	2.4	0.1	0	0	0.7		0.1					**4.8**
Senegal	98	14.9	2.6	8.3	0.6	2.7		0.1					**127.3**
Sierra Leone	53.4	9.4	2.7		0.3	0.8		0.2			3.8	1.3	**71.8**
Solomon Islands	2.4	2.3		0.1		0.4		0.1					**5.4**
Somalia	12.8	26.2	1.2		0.2	0.7						1.2	**42.3**
South Sudan	15.6	18.5	5.9	4.7	0.2	0.6						1.9	**47.5**
Sri Lanka	23	4.5			0.7	0.9				0.1			**29.2**
Sudan	283.9	39.9	11.2	26.7	1.3	3.9							**367**
Tajikistan	23.1	5.5	2.4		0.3	0.6							**31.9**
Timor-Leste	1.2	3.1				0.2				1.5			**5.9**
Togo	44.2	7.4	3	4	0.3	1.1		0.2	0.1			1.5	**61.7**
Turkmenistan	1				0.2	0.1							**1.2**
Uganda	313.8	32.4	9.2	4.6	1.2	5.7						6.6	**373.4**
Ukraine	2.7				0.7	0.1							**3.5**
United Republic of Tanzania	352.4	13.3	11.4	11.5	1	10.2		0.2				4.9	**404.9**
Uzbekistan	62.9	7.4	0		0.7	2.4				0.2		1.2	**74.8**
Vietnam	120.8	40.7	1.9	14.9	3.2	3.2				2.9		0.9	**188.5**
Yemen	207.1	24	5	7.5	1.2	2.1							**247**
Zambia	135.4	7	3.9	4.5	0.7	2.9							**154.3**
Zimbabwe	92.4	7.1	1.5	3.8	0.9	1.7		0.2					**107.6**
Grand total:	**8,986**	**1,580.2**	**360.6**	**494.5**	**113.5**	**189.5**	**29.4**	**5.8**	**2.8**	**12.9**	**12.7**	**98**	**11,885.9**

Notes:

a – Approvals are a subset of commitments that have been approved by the Gavi Board (or Executive Committee) or the Gavi CEO. Only such approved amounts can be disbursed subject to all other conditions for disbursement being met by the countries. Approvals are typically granted for the current year and one further year.

b – Civil society organisation Type A support is not included as these approvals are not country specific.

General note:

Approvals for Gavi Phase I (2000–2006) have been adjusted to reflect the final actual amount disbursed.

Approvals totalled US$ 9,404 million to the end of 2016, US$ 1,424 million in 2017 and US$ 1,058 million in 2018.

Source: Gavi, the Vaccine Alliance, 2018

6 Commitments and Board approvals for investment cases

as of 31 December 2017 (US$ millions)

Commitments for investment cases 2003–2021[a]

Programme	Vaccines	Operational costs	Cold chain equipment	Implementation costs	Total
Measles	60.4	115.6			176.0
Measles-Rubella Initiative	22.0	33.0			55.0
Meningitis	207.8	34.3			242.2
Maternal and neonatal tetanus	16.3	45.3			61.6
Polio	143.3	48.0			191.3
Yellow fever	150.1	49.3			199.4
Cholera	94.5	20.0			114.5
Ebola	5.0				5.0
Humanitarian response (Syria)	26.2		13.5		39.8
Malaria vaccine pilots				27.5	27.5
Other	5.0	0.5			5.5
Total:	**730.7**	**346.0**	**13.5**	**27.5**	**1,117.7**

Board approvals for investment case expenditure 2003–2018[b]

Programme	Vaccines	Operational costs	Cold chain equipment	Implementation costs	Total
Measles	60.4	115.6			176.0
Measles-Rubella Initiative	22.0	33.0			55.0
Meningitis	90.5	29.1			119.6
Maternal and neonatal tetanus	16.3	45.3			61.6
Polio	143.3	48.0			191.3
Yellow fever	150.0	49.3			199.3
Cholera	47.3	20.0			67.3
Ebola	5.0				5.0
Humanitarian response (Syria)	26.2		13.5		39.8
Malaria vaccine pilots				24.6	24.6
Other	5.0	0.5			5.5
Total:	**566.1**	**340.8**	**13.5**	**24.6**	**945.0**

Notes:

a – Commitments represent endorsements of multi-year programme budgets made by the Gavi Board (or Executive Committee) or the Gavi CEO. These endorsements do not constitute a liability to pay but instead send a positive signal that Gavi intends to fund a programme over its entire life span subject to performance and availability of funds.

b – Approvals are a subset of commitments that have been approved by the Gavi Board (or Executive Committee) or the Gavi CEO. Only such approved amounts can be disbursed subject to all other conditions for disbursement being met by the countries. Approvals are typically granted for the current year and one further year.

Source: Gavi, the Vaccine Alliance, 2018

Our aspiration 2016–2020

10%
reduction
in child mortality rates

300
million children
vaccinated through routine programmes

5–6
million lives
saved over the long term

250
million years
lost due to disability or premature death (DALYs) averted

100%
of vaccine
programmes sustained after our financial support ends

The Vaccine Alliance is funded by

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Canada
China
Denmark
European Commission
France
Germany
India
Ireland
Italy
Japan
Kingdom of Saudi Arabia
Luxembourg
Netherlands
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Russian Federation
South Africa
Spain
State of Qatar
Sultanate of Oman
Sweden
Switzerland
United Kingdom
United States of America

Foundations, organisations, and corporations

Alwaleed Philanthropies
Bill & Melinda Gates Foundation
His Highness Sheikh Mohammed bin Zayed Al Nahyan
OPEC Fund for International Development (OFID)
Absolute Return for Kids
Anglo American plc
The Children's Investment Fund Foundation (UK)
China Merchants Group
Comic Relief
Deutsche Post DHL
ELMA Vaccines and Immunization Foundation
Girl Effect
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Gavi/2015/GMB Akash
UNICEF/2017/Lemoyne
UNICEF/2015/Kiran Panday
2015/Sean Hawkey
Gavi/2013/ Evelyn Hockstein

Gavi prepares an Annual Financial Report for each calendar year, which includes the audited consolidated financial statements of the Gavi Alliance and of the International Finance Facility for Immunisation. The 2017 Annual Financial Report will be approved by the Board and published on the Gavi website in September 2018: www.gavi.org/funding/financial-reports.

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Cover printed on Olin Smooth Absolute White. Inside printed on Olin Rough Absolute White.

Annual Progress Report

2020
2019
2018
2017
2016

Developing countries prevented 2.5 million future deaths in 2016–2017 thanks to Gavi-supported vaccines.

This puts us on track to reach our 2020 target of 5–6 million averted deaths in the current strategy period.

Gavi
The Vaccine Alliance

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