

Preparing for the withdrawal of all oral polio vaccines (OPVs):

Replacing trivalent OPV with bivalent OPV

*Frequently Asked Questions
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Abbreviations

bOPV	bivalent oral poliovirus vaccine; containing serotypes 1 and 3
cVDPV	circulating vaccine-derived poliovirus type 2
cMYP	comprehensive multi-year plans for immunization
EPI	Expanded Programme on Immunization
IPV	inactivated poliovirus vaccine
mOPV	monovalent oral poliovirus vaccine
OPV	oral poliovirus vaccine
SAGE	Strategic Advisory Group of Experts on Immunization
SIA	supplementary immunization activity
tOPV	trivalent oral poliovirus vaccine
VAPP	vaccine-associated paralytic poliomyelitis
UNICEF	United Nations Children’s Fund
VDPV	vaccine-derived poliovirus
WHO	World Health Organization
WPV	wild poliovirus

Since the release of the *Polio Eradication and Endgame Strategic Plan 2013-2018*, planning has begun worldwide to expedite the interruption of all poliovirus transmission and build stronger systems for the delivery of lifesaving vaccines.

In preparation for the eventual removal of all OPVs, WHO recommended in its position paper of January 2014 (Weekly Epidemiological Record, 28 February 2014) that all OPV-using countries begin strengthening immunization systems and introduce at least one dose of Inactivated Polio Vaccine (IPV) into routine programmes by the end of 2015. The global focus is now expanding to plan for the replacement of trivalent OPV (tOPV) with bivalent OPV (bOPV) in all OPV-using countries.

Rationale for OPV cessation

Why stop using OPV?

OPV is made with attenuated (weakened) polioviruses. On extremely rare occasions, the vaccine can cause cases of vaccine-associated paralytic polio (VAPP) and circulating vaccine-derived polioviruses (cVDPVs). To prevent cVDPVs and VAPP, OPV must be withdrawn as soon as possible after the end of wild poliovirus (WPV) transmission.

tOPV contains all three poliovirus serotypes (1, 2 and 3), and the use of this vaccine has led to the successful eradication of wild poliovirus type 2 (WPV2), with the last case occurring in 1999. Today, over 90% of cVDPV cases, and approximately 40% of VAPP cases are due to the type 2 component of tOPV.

With at least one dose of IPV in place as a risk mitigation measure, OPVs will be removed in a phased approach, beginning with removal of the type 2 poliovirus strain in a switch from tOPV to bOPV. bOPV contains types 1 and 3, and therefore will continue to protect against transmission of WPV1 and WPV3. Once all wild polioviruses have been fully eradicated, then all OPVs will be withdrawn.

Why can't countries eliminate the use of OPV entirely, rather than switch to bOPV?

Because IPV is an inactivated vaccine and not a "live" attenuated vaccine, it carries no risk of VAPP. However, in contrast to OPV, since it does not replicate in the gut, IPV induces lower levels of intestinal immunity and does not confer protection to others. IPV is also less effective than OPV in reducing fecal-oral transmission. Using both vaccines together provides the best form of protection.

When is it expected we will cease all use of OPV?

The goal is to cease all use of OPV by 2020. Depending on the timing of the switch and the detection of further transmission of polioviruses, countries may be able to cease all use of OPV as early as 2019.

Is OPV safe?

Yes. OPV is extremely safe and effective at protecting children against lifelong polio paralysis. More than 10 million cases of polio have been prevented, and the disease has been reduced by more than 99%. Because it is safe, effective, and easy to administer, OPV has been used to vaccinate nearly 2.5 billion children against polio and has nearly halted transmission of the poliovirus.

About the switch from tOPV to bOPV

Why is it necessary for all countries to switch from tOPV to bOPV?

All oral polio vaccines are made from attenuated (weakened) polioviruses that, in very rare cases, can result in cases of VAPP and cVDPVs. According to monitoring data from the Global Polio Eradication Initiative (GPEI), over 90% of the approximate 750 paralytic cases due to cVDPVs between 2000 and 2012 and 40% of VAPP cases were derived from OPV type 2.

To minimize the risk of continued type 2 cVDPV (cVDPV2) cases, the type 2 component of OPV (OPV2) will be phased out globally from all immunization activities. Globally, all immunization programmes that use OPV will be required to switch from tOPV to bOPV in a coordinated manner.

What is the switch?

The switch refers to the replacement of all tOPV with bOPV (containing types 1 and 3 only) in routine immunization and supplemental immunization activities (SIAs), in every country around the world within a 2-week timeframe. Currently, the switch from tOPV to bOPV is expected to take place in April 2016. A precise date will be established at least 6 months in advance of the planned date of the switch to bOPV. This will enable national health authorities and implementers to plan appropriately. Once the switch is made, tOPV will no longer be used anywhere in the world, and manufacturers will no longer supply tOPV (production will have stopped much sooner due to production lead times).

What is the objective of the switch?

The objective of the switch is to stop the emergence of cVDPV2 and VAPP caused by the attenuated type 2 strain of tOPV. The planned withdrawal of the type 2 component of tOPV is part of the global polio eradication endgame strategy for 2013-2018.

What is the difference between tOPV and bOPV?

tOPV contains attenuated poliovirus serotypes 1, 2, and 3 while bOPV contains attenuated poliovirus serotypes 1 and 3 only. Both vaccines have been administered to billions of children and have excellent safety profiles. Both are administered orally.

Will the switch from tOPV to bOPV eliminate all cVDPV cases?

No. The purpose of the switch is to eliminate persistent cVDPVs associated with the type 2 serotype and to boost protection against wild poliovirus types 1 and 3 (the switch will not prevent type 1 or type 3 cVDPVs). 'Persistent cVDPVs' refer to cVDPVs known to have circulated for more than six months.

If the last wild poliovirus type 2 (WPV2) was reported in 1999, why is type 2 only now being removed from OPV?

This is taking place now for a number of reasons:

- Until recently, WPVs caused the vast majority of paralytic polio cases and attracted the vast majority of attention. During this time, tOPV has continued to be the best strategy for fighting polio. In recent years, great progress has been made in reducing polio transmission, particularly with the South East Asia region being certified as polio-free in March 2014.
- Developments in laboratory capacity have allowed for a better appreciation of the burden caused by cVDPV2s.
- Only in the last few years have data become available which show that switching to bOPV could aid eradication of WPVs, as bOPV provides better immunogenicity than tOPV to WPV1 and WPV3.
- Currently, WPV cases reached such low levels that cVDPVs are causing a relatively high proportion of paralytic polio cases.
- Bivalent OPV had to be available to make the switch to bOPV possible, and bOPV has only become available in the last few years.

Understanding risk and maintaining protection with IPV

Are there any risks associated with the switch from tOPV to bOPV?

The switch from tOPV to bOPV may lead to an increase in the number of individuals susceptible to poliovirus type 2, which in turn will increase the risk of new cVDPV type 2 outbreaks after OPV type 2 cessation, if a cVDPV2 appears. To help mitigate this risk, all countries are requested to introduce at least one dose of IPV (containing types 1, 2, and 3) into their routine immunization programmes by the

end of 2015, and to destroy tOPV stocks immediately after the switch. Selected countries will also conduct SIAs with tOPV in the months leading up to the switch.

The introduction of IPV will help to reduce risks associated with the withdrawal of OPV type 2, facilitate interruption of transmission with the use of monovalent OPV type 2 in the case of outbreaks, and hasten eradication by boosting immunity to poliovirus types 1 and 3.

Will children have protection from wild poliovirus type 2 or from circulating vaccine-derived type 2 polioviruses after the switch to bOPV? How will they be protected from type 2 polioviruses?

IPV protects children against polioviruses types 1, 2 and 3. After the switch from tOPV to bOPV, IPV use will help to protect against paralytic poliomyelitis from poliovirus type 2 and offer additional protection against types 1 and 3.

If both OPV and IPV are given to the same child, is a vaccine overdose possible?

No. In fact, the vaccines can work together to induce a stronger immune response, especially in areas where wild poliovirus and/or VDPVs are still circulating. Many countries have used OPV and IPV sequentially in their routine schedules for decades.

What risks are associated with the switch in areas with low immunization coverage?

Countries or areas with low routine immunization coverage will be more vulnerable to any emergence of cVDPV type 2 after the switch, because these areas will have pockets of individuals who are not reached with IPV and therefore have no direct protection against poliovirus type 2, even if they are reached in campaigns with bOPV.

For this reason, countries with low population immunity against type 2 poliovirus will need to undertake risk mitigation activities consisting of additional SIAs with tOPV during the 6 months prior to the switch. The criteria for which countries need these additional SIAs will be based on an epidemiological assessment of risk levels and recommendations by SAGE in October 2014.

Timing of the global switch from tOPV to bOPV

When will the switch happen?

The earliest opportunity for the switch to occur is April 2016, during the low season of poliovirus circulation in the countries with the most recent, persistent transmission of poliovirus.

Once the final decision to proceed with the switch is made, the decision is irrevocable and must be implemented by all countries simultaneously during the identified switch window. Countries will have six months to make final preparations for the switch, but the switch will proceed even if newly emerged circulating type 2 VDPVs are identified during the six months between the final decision to proceed with the switch and the execution of the switch.

How will the switch date be determined?

The remaining countries with persistent transmission are expected to identify their last cases of persistent circulating type 2 VDPV in late 2014 or early 2015. Six months later, if no new cases from the same strains are detected, then transmission can be considered interrupted. In May 2015, the World Health Assembly will assess progress and consider a draft resolution proposed by the WHO Executive Board in January 2015 calling on Member States to implement the switch.

In September 2015, a risk assessment will be conducted to determine whether the switch would be appropriate and feasible. At its meeting in October 2016, the Strategic Advisory Group of Experts (SAGE) for immunization will confirm the switch date. Because the switch needs to occur during the

low season of poliovirus circulation (January through May) and requires at least six months for preparation, the earliest opportunity for the switch to occur is in early 2016.

Why do all countries need to make the switch from tOPV to bOPV at the same time?

It is important that all countries currently using tOPV switch from tOPV to bOPV during the same time period to ensure that no country is put at risk of importing a cVDPV2 from another country that continues to use tOPV.

Will the switch still take place if a new cVDPV2 emergence occurs before September 2015?

If there is a new VDPV2 emergence before September 2015, targeted SIAs will be implemented to respond to this outbreak, but the switch will proceed.

Can countries make the switch from tOPV to bOPV in their routine immunization programmes before the expected April 2016 switch date?

No, it is not recommended that some countries switch before April 2016 while others do not. Switching at the same time is the best way to limit the risk of cVDPV2 emergence and spread.

Changing vaccines is a complicated process; it took months to transition from DTP to pentavalent in my country. Must the timeline be adhered to strictly?

Yes. Acknowledging that transitioning from one vaccine to another is a complex and challenging process, the epidemiology of polio requires a rapid transition from tOPV to bOPV to prevent emergence of type 2 cVDPVs. The more simultaneously the switch from tOPV to bOPV occurs within and across countries, the smaller the risk of VDPV type 2 re-emergence.

The timeline for the switch does not observe country contexts (e.g., elections, reform process, holidays, etc.). Can we adjust the timeline to better match the context?

Countries are welcome to implement the switch anywhere within the two week 'switch window' when it is announced. This gives each country some flexibility in an otherwise rigid timeline.

How will validation work? Is it possible to validate that the switch has happened and that tOPV is not used?

Validation works differently in countries at higher risk of cVDPV than in countries at lower risk of cVDPV. High-risk countries will use independent Switch Monitors to confirm the absence of tOPV at all public and private service points. These countries will be validated as 'tOPV free' when they can show that all the vaccine storage points and health facilities have been visited and confirmed to have no tOPV. Lower risk countries must establish their own validation system to confirm the absence of tOPV stock and make their findings credible to the global community.

Why does the switch have to occur so soon? Why is the timeline to prepare so short?

If well executed, the switch will both eliminate the many type 2 cVDPV and VAPP cases occurring annually and aid in the eradication of the remaining wild polioviruses. The timeline for the final preparations for the switch will be six months, whether it occurs in April 2016 or any year thereafter. The reason is that the switch needs to occur during the low-season of polio transmission and after confirming that transmission of persistent type 2 cVDPVs has been interrupted.

Preparing for the switch from tOPV to bOPV

What do countries need to do now to prepare for the switch from tOPV to bOPV? When should countries begin planning for the switch?

Preparation for the switch at the national level should begin now. Countries have already started to introduce IPV in order to help mitigate risks related to the switch. As soon as possible, countries that require national licensure of bOPV should begin the process of registering bOPV for use in routine

immunization. Those countries that currently rely on national OPV production will need to develop and license bOPV by the end of 2015. The Global Polio Eradication Initiative (GPEI) will prioritize its work with manufacturers in these countries to ensure sufficient access to bOPV in advance of tOPV withdrawal.

What kind of guidance will be available for countries? When will it be available?

WHO, UNICEF and partners are developing guidance for countries in a number of areas, including communications, stock management and monitoring, and health worker training. Many materials will be available as generic templates for countries to adapt to their local context and translate as needed.

All materials will be made available on the WHO website focused on IPV introduction, OPV withdrawal and routine immunization strengthening:

http://www.who.int/immunization/diseases/poliomyelitis/endgame_objective2/en/

Supply and forecasting bOPV

Will there be enough supply of bOPV for all countries to make the switch at the same time?

Yes. UNICEF, partners, and manufacturers are working together to ensure adequate supply of both bOPV and tOPV when needed as well as to minimize tOPV overstock risk at country and global levels.

How much will bOPV cost? Will it cost more, less, or the same as tOPV?

The price of bOPV will be the same as or less than tOPV, depending on the supplier. Prices are available on UNICEF's website at <http://www.unicef.org/supply/files/OPV.pdf>

Since it is not yet certain that April 2016 will be the global switch date, when should countries start placing orders for bOPV instead of tOPV?

Any procurement of tOPV from now until the switch should be based on accurate inventories of tOPV stocks as well as planned supplementary activities to minimize the risk of overstocks after the switch. As soon as possible, procurement plans should be shared with UNICEF, or in the case of self-procuring countries, with the relevant supplier to facilitate timely procurement of the appropriate amounts of tOPV and bOPV for the transition.

If a country usually places its orders for stock on long timelines, for example, 12 months or more from when it is needed, should those countries begin placing orders for bOPV prior to the September 2015 decision on a global switch date?

In anticipation of a switch date in April 2016, all countries that procure vaccines on a yearly basis are encouraged to break-up their order for tOPV from 2015 through mid-2016 into multiple parts:

- An initial order of tOPV covering the period until the global decision is taken in September 2015, and the three months afterwards, through December 2015.
- A three-month supply (plus two week buffer) of tOPV covering the last 3 months before the switch
- A three-month supply of bOPV for the first three months after the switch

Reducing the orders to cover periods shorter than 3 months would be counterproductive, as it would multiply the number of orders and increase transportation costs. In addition, in order to ensure sufficient supply of both vaccines, suppliers should be provided forecasts that take into account manufacturing lead times.

Countries procuring through UNICEF will need to coordinate with the local UNICEF Country Office and UNICEF Supply Division on the forecasted provisional plan, and upcoming orders may need to be adjusted.

How should countries forecast quantities needed of tOPV and bOPV?

Close ongoing management and monitoring of tOPV stocks and requirements up to April 2016 will be critical at both public and private sector facilities. In addition to closely tracking remaining quantities of tOPV to identify and minimize the quantities that need to be disposed of, countries should be calculating the projected quantity of bOPV that will be needed. Up-to-date inventories paired with historical consumption figures should give countries an accurate forecast of quantities needed for both tOPV and bOPV.

If a country uses all of its stock of tOPV in the months prior to the established global switch date, can it then start using bOPV?

Using bOPV prior to the switch will put communities at risk of contracting cVDPV2 from neighboring communities that are still using tOPV. WHO recommends that shortages be prevented by carefully monitoring inventories and ordering a 2-week buffer stock of tOPV vaccine prior to the switch.

Disposal of remaining inventories of tOPV

What should happen to unused supplies or inventories of tOPV after the global switch to bOPV?

After the switch date, all remaining tOPV supplies or stocks should be collected from both public and private facilities and destroyed. There are several ways to dispose of unused tOPV vials; by encapsulation and disposal in a landfill site, direct disposal in an engineered landfill site, or through incineration in high- or medium-temperature incinerators.

The collection and proper disposal of all tOPV stocks should be well-documented, and the overall switch plan should include these activities and corresponding financing. After the switch, the national registration of tOPV should be cancelled and only bOPV should be used in routine immunization programmes and SIAs.

Why do unused supplies or inventories of tOPV need to be destroyed immediately after the switch?

The accidental or deliberate use of tOPV after the switch could cause outbreaks of cVDPV2, particularly because the number of individuals susceptible to infection with poliovirus type 2 will increase after the switch. Destroying all tOPV will eliminate the risk of such cVDPV2 outbreaks.

If countries have unused supplies or inventories of tOPV after the switch date, can they first use those supplies before making the switch to bOPV?

No. They must stop using tOPV on the switch date and any remaining inventories must be destroyed. Any area continuing to use tOPV after all others have switched to bOPV puts neighboring communities at risk of a cVDPV2 outbreak. This risk increases over time as population immunity against type 2 declines.

Outbreak response

What will happen if a country has a type 2 poliovirus case, outbreak, or accidental release, after it has switched to bOPV?

Following the switch, monovalent OPV type 2 (mOPV2) will be the vaccine of choice for responding to any cVDPV type 2 outbreak or any accidental WPV2 release from a laboratory or facility. An initial stockpile of 500 million doses of mOPV2 is being procured and will be available prior to the switch date for outbreak response.

Will a country be able to obtain tOPV in the event of a type 2 poliovirus case or outbreak?

No. No additional tOPV will be produced or available after the switch.

Will countries have access to mOPV2 for outbreak response, or should they put some aside now?

How will countries pay for mOPV2?

Countries will have access to the global stockpile of mOPV2 and should not need to establish a national stockpile. The global stockpile is being completely financed by global partners, and countries will be provided mOPV2 at no cost to them in the event of an outbreak. They will not need to procure mOPV2.

What is the risk that using mOPV2 to respond to a cVDPV2 outbreak will cause another cVDPV2 outbreak?

While it is possible for mOPV2 to trigger a cVDPV2 outbreak, the risk is very small – much smaller than the risk of failure to contain an existing cVDPV2 outbreak. In some circumstances, IPV may also be used in response in targeted risk areas. The risk is further minimized if high coverage is achieved during the response. At its meeting in October 2014, SAGE endorsed the principles for outbreak response in the post-OPV2 withdrawal era, and guidelines for countries will be communicated in due course.

More information

Where can I learn more about the switch?

Resources to support the transition from tOPV to bOPV will be available at the website for objective 2 of the *Polio Endgame Plan*, which will be regularly updated as soon as new information is released:

http://www.who.int/immunization/diseases/poliomyelitis/endgame_objective2/en/