

1NJECTION

One injection, ten years' protection...

THE YELLOW FEVER INITIATIVE



World Health
Organization

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The problem: a deadly disease returns

Of all the epidemic-prone diseases, yellow fever numbers among the most greatly feared and disruptive. It is also an especially efficient killer. From its ancestral homes in the Americas and sub-Saharan Africa, the disease caused devastating epidemics for at least four centuries, killing up to 85% of those infected and virtually closing down seaports and commercial hubs.

At the start of the 20th century, scientists linked the disease to *Aedes aegypti* mosquitoes, opening the first prospects for control. The next breakthrough came in 1937, when a safe, highly effective, and inexpensive vaccine – the 17D strain, which remains the standard today – was developed.



Control initiatives in both the Americas and Africa brought spectacular results. In the Americas, environmental improvements attacked the disease at its roots. In Africa, mass immunization campaigns in several countries, initiated in 1940 and repeated every four years, gradually caused the disease to disappear. These results were thought to be permanent, and the world let down its guard. In Africa, mass vaccination ceased.

In reality, however, the elimination of yellow fever from cities in the Americas and Africa was never more than a partial victory, as the disease remained hidden in the forests, waiting for the right conditions to re-emerge. In Africa, this happened, first gradually, then rapidly as immunity progressively faded away.

Today, WHO estimates that yellow fever causes 200 000 cases and 30 000 deaths each year. During epidemics in unvaccinated populations, case-fatality rates among severe cases may exceed 50% for adults and 70% for children. No treatment beyond supportive care is available.

The vast majority of cases and deaths are concentrated in a belt of 12 African countries, where yellow fever has become – once again – a major public health concern.

About the disease: terrifying symptoms

Yellow fever is a viral disease of variable severity, known today to belong to the same group of haemorrhagic diseases that includes the Ebola, Marburg, and Crimean-Congo fevers.

While most patients recover after an initial febrile stage, others pass through a brief period of remission and enter a severely toxic phase characterized by damage to multiple organs, including the liver and kidneys, generalized haemorrhagia, often accompanied by black “coffee-ground” vomiting, and other haemorrhagic signs culminating in shock.

Jaundice resulting from liver failure accounts for the name of this disease. The alternative name, “black vomit”, is a further testament to the terrifying symptoms. No treatment beyond supportive care exists.

“ WHO estimates that yellow fever causes 200,000 cases and 30,000 deaths each year. ”

A new partnership for an acute threat

This situation is now poised to change – in striking and sustainable ways. A new initiative, supported by the GAVI Alliance, has just been launched to combat yellow fever in the 12 West and central African countries carrying the world's highest burden of this disease.

The new partnership capitalizes on lessons from the past and aims to prevent potentially catastrophic outbreaks in the future. It unites financial support from GAVI with the joint collaboration of WHO and UNICEF and full engagement of ministries of health. Within its general framework, the initiative has space for a range of additional partners.

GAVI is providing the funds to

- vastly increase the supply of yellow fever vaccine (procured by UNICEF)
- expand immunization coverage (in collaboration with ministries of health), and
- support WHO in a risk assessment exercise aimed at identifying target populations and supporting government decisions.

The initiative comes at the right time. It allows a preventive approach to a major risk: the occurrence of explosive, deadly, and disruptive outbreaks of urban yellow fever, the most feared form of this disease. In large parts of Africa, the conditions are ripe for this



to happen. The cessation of mass vaccination campaigns has left vast populations vulnerable to infection. Increased virus circulation in poorly immunized populations has occurred in tandem with very rapid urban growth, often in the form of sprawling shanty-towns with poor sanitation.

The efficient and highly domesticated vector, *A. aegypti*, flourishes under such conditions. Known as the “container breeder”, this mosquito proliferates readily in discarded rain-filled consumer items and water storage containers, and spreads easily among humans in crowded settings. In such situations, a single case of yellow fever can ignite an explosive epidemic.

“ ... a single case of yellow fever can ignite an explosive epidemic. ”

Fluid population movement, often provoked by conflict, maintains a constant threat of imported cases and a constant influx of immunologically naive populations into previously vaccinated areas.

The initiative also responds to the well-founded fear that multiple outbreaks might occur simultaneously, thus undermining the response capacity of countries, the international community, and the vaccine industry. Most importantly, it has a number of unique features designed to move the response to this disease from the emergency management of crises to population-wide prevention.



Urban outbreaks: a powder-keg with a short fuse

The prospect of urban outbreaks in parts of Africa has placed the world on edge. When conditions are ripe, a single case can ignite an explosive epidemic. International concern has increased following a progression of recent “firsts” in Africa.

- 1960** **Ethiopia.** Largest recorded outbreak (100 000 cases and 30 000 deaths) in Africa.
- 1983** **Burkina Faso and Ghana.** Severe and rapidly spreading outbreaks, with a case fatality rate in Ghana of 80%.
- 1992** **Kenya.** First outbreak since 1943.
- 1996** **Benin.** First outbreak since 1951. The outbreak raged for eight months.
- 2001** **Côte d'Ivoire.** First urban outbreak.
- 2002** **Senegal.** First urban outbreak.

A value-added initiative

At the heart of the new yellow fever partnership is a set of forward-looking principles. First, the initiative makes the most of a very good tool. The yellow fever vaccine is safe, highly effective, and confers immunity that lasts at least 10 years, and possibly for a lifetime. Second, it uses this tool to aim for the prevention of outbreaks, while also supporting the immediate management of emergencies. Now, with a greatly expanded supply of vaccine, broad population coverage is possible, thus building an immune barrier that protects against sweeping epidemics.

Third, in doing so, the initiative improves vaccine security. In the past, outbreak management has often been compromised by a fragile and unreliable vaccine supply, with little surge capacity when crises arise.



GAVI funding will now make it possible to increase the vaccine annual reserve from 6 to 11 million doses. The new partnership further acknowledges the need to maintain a stockpile of 6 million vaccine doses as a “safety net” for unpredictable events.

“ The initiative will be welcomed by populations as well as supported by governments. ”

In terms of its focus, the partnership targets high-risk groups in high-burden countries. Funds being provided to WHO will be used to identify target populations for priority vaccination and support the planning and implementation (together with UNICEF) of high-quality campaigns, emphasizing vaccine safety, surveillance for adverse effects, and proper management of wastes. A region-wide approach is another essential feature that takes into account the reality of the situation, where large-scale migration across porous borders means that no area can be securely protected so long as immunization coverage in other high-risks areas remains poor.

Equally important, the initiative builds on pre-existing political commitment. In all 12 target countries, governments have already

demonstrated, through the inclusion of yellow fever in routine childhood immunization programmes, their commitment to this disease as a high priority on the health agenda. Moreover, because yellow fever is so greatly feared, the initiative will be welcomed by populations as well as supported by governments. Ownership by governments and their populations is recognized as essential for sustainable success.

Finally, the partnership is well-aligned with current thinking about the best ways to use health initiatives to spearhead overall development. In the spirit of the millennium development goals, the initiative is poor in its focus and expected results,

directly supporting three of the eight goals and indirectly supporting two more. Implementation of such a large-scale and well-supported programme will drive improvements in surveillance, health infrastructure, and laboratory capacity. The promise is great that this new initiative will stimulate both technical and practical innovation in ground-breaking ways.

Innovative in its design, forward-looking goals and operational approach, the new yellow fever partnership will serve as a model for other initiatives attempting to tackle difficult, acute, and tenacious threats in sustainable ways.



A bright future – 10 years ahead



The new partnership has been planned in a way that can achieve a rapid reduction of the disease burden ten years ahead of schedule. To reduce the risk of outbreaks substantially, vaccination coverage needs to reach 80% of an at-risk population.

Recent progress in routine childhood immunization, supported by GAVI, has been impressive, but this strategy alone is not enough – the majority of the population will remain unprotected until sufficient birth cohorts are reached through routine immunization.

Using this strategy alone, the achievement of sufficiently high population coverage would take at least 20 years. The new initiative takes this situation a big step forward. GAVI support now makes it possible to meet three pressing needs.

The GAVI contribution will:

- increase the size of the vaccine stockpile dramatically
- cover part of the operational costs of preventive campaigns
- support WHO in conducting the surveillance needed to identify high-risk populations.



The stockpile has a dual function: it allows rapid release of vaccine when emergencies occur; unused vaccine is then channelled into preventive campaigns. Together, these functions neatly meet the most important objectives for control: the immediate management of emergencies and the prevention of their occurrence in the future.

The partnership will now make it possible to vaccinate more than 48 million people – targeted as at high risk – over the coming five-year period. Doing so will build a powerful immune barrier as a protective shield for the future. It will move the attainment, in the 12 highest-burden countries, of a future secure from the threat of urban yellow fever ten years ahead of schedule.

During the course of project implementation, health systems will be strengthened to meet the needs for timely detection of outbreaks, rapid laboratory confirmation, and mapping of risks. Improved surveillance capacity will, in turn, reveal trends useful in predicting epidemics and forecasting vaccine needs.

The initiative thus has a built-in mechanism for making itself more efficient. Moreover, because vaccination confers such long-lasting protection, the benefits, too, should last a lifetime. Once adequate population coverage has been achieved, programmes for routine childhood immunization – already in place – can then take over as the strategy for ensuring sustainable gains.

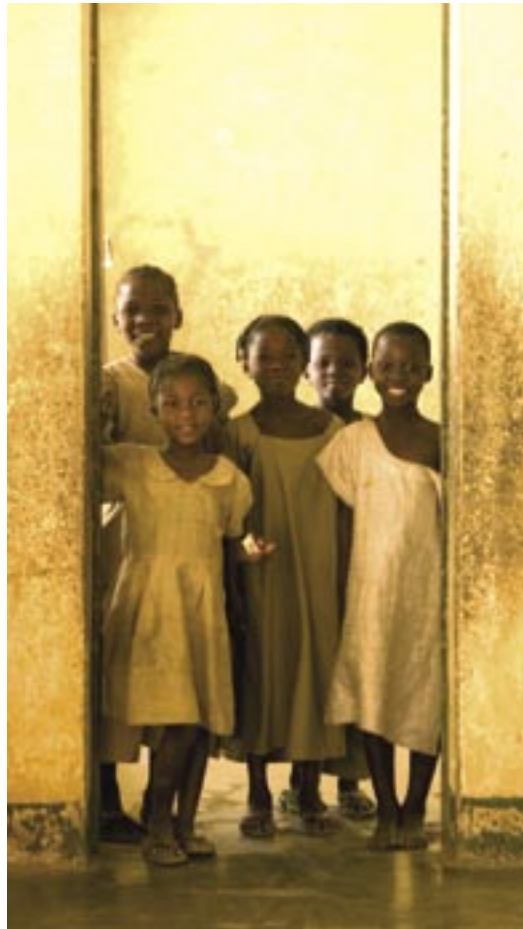
When all these features are viewed together, the promise is enormous. In the 12 countries that bear the world's heaviest burden of yellow fever, the new partnership has the potential to make deadly and disruptive urban epidemics a thing of the past – this time for good.

“ The partnership will now make it possible to vaccinate more than 48 million people – targeted as at high risk – over the coming five-year period. ”

A model initiative with forward-looking principles

In summary, the Yellow Fever Initiative:

- Starts with a good tool – a safe vaccine that confers long-lasting immunity
- Uses this tool to build an immune barrier
- Does so in a way that improves vaccine security
- Maintains a safety net of vaccine for unpredictable emergencies
- Targets high-risk groups in high-burden countries
- Uses a region-wide approach to secure its gains
- Builds on existing political commitment
- Is pro-poor in focus and expected results
- Drives improvements in surveillance, infrastructure and laboratory capacity
- Stimulates technical and practical innovation



NOTES

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