YELLOW FEVER

What is it?
- Yellow fever is a mosquito-transmitted disease that attacks the liver and can be severe, even fatal. It has been a notorious scourge for centuries that once caused major epidemics in southern Europe and the United States, including one that killed almost 10% of the population in Philadelphia, then the U.S. capital, in 1793.
- Today, yellow fever occurs in the tropical regions of Africa and South and Central America. There are some 200,000 cases annually, 90% of them in Africa. Many scientists worry that big new epidemics may happen any time.
- The yellow fever virus belongs to the Flaviviruses, a group that also includes the dengue virus, the Zika virus, and the West Nile virus. Its name comes from the fact that some patient’s skin and eyes turn yellow, a symptom called jaundice.

What are the symptoms?
- For most people, yellow fever is unpleasant but not life-threatening. The symptoms, which usually start 3 to 6 days after the bite of an infected mosquito, include fever, headaches, muscle pain, back pain, fatigue, nausea, and vomiting. Patients usually recover within 3 to 4 days.
- However, about one in seven patients proceeds to a far more dangerous phase in which toxins damage the liver, leading to jaundice. Patients may also have abdominal pain and may bleed from the mouth and eyes. Vomit can be bloody and black. Between 20% and half of patients in this phase die. (This means that roughly between 3% and 8% of all yellow fever patients die.)

How does it spread?
- Yellow fever is spread by mosquitoes. There are three different types, or ‘cycles’ of transmission:
  - Sylvatic (or jungle) yellow fever. The virus infects monkey species living in tropical rain forests. Mosquitoes that bite both monkeys and people will sometimes transmit the virus to a human being.
  - Intermediate yellow fever. This happens when people live in close proximity to monkeys and to mosquito species that bite both - for instance, when human settlements encroach on the jungle. There aren’t just occasional cases but outbreaks that can affect multiple villages. This is the most common type of outbreak in Africa, according to the World Health
Organization (WHO).

- **Urban** yellow fever. This is the cycle that keeps public health experts up at night. Once the virus makes it into cities, the yellow fever mosquito (*Aedes aegypti*), which bites mostly humans, starts spreading it from one person to the next, causing outbreaks that rapidly get out of hand, especially in areas where few people are vaccinated and where mosquitoes finds lots of places to breed. That happened in 2016 in Angola and the Democratic Republic of the Congo for instance. Early 2017 - when this fact sheet was written - there was an urban yellow fever outbreak in Brazil.

- Asia has not seen urban yellow fever outbreaks. Scientists don't know why; there are plenty of big cities that have massive *Aedes aegypti* populations. If yellow fever started spreading there, it could be catastrophic.

**How is it treated?**

- There are no specific antiviral drugs for yellow fever. But good 'supportive care' can increase a patient's chances or survival. That includes preventing dehydration and treating liver and kidney failure. Some yellow fever patients also develop bacterial infections; they can be treated with antibiotics.

**How can it be prevented?**

- There are safe yellow fever vaccines that are relatively cheap (less than $2 per dose) and that offer lifelong protection. Unfortunately, many people in areas at risk aren't vaccinated, and the vaccine is in short supply; only four manufacturers in the world make it. 

- There is a global stockpile of 6 million vaccine doses that can be used in countries that have an epidemic and a vaccine shortage. The stockpile is managed by the World Health Organization (WHO) together with three other organizations. But 6 million isn't much. The supply ran out during the 2016 outbreak in Angola and the DRC; in a strategy to stretch it, many people in Kinshasa received only one fifth of the normal dose, which scientists believe is not ideal but probably still effective. Many yellow fever experts think the stockpile should become bigger.

- Where vaccines are unavailable, outbreaks can be fought by controlling the mosquito population by spraying insecticides and killing mosquito larvae. People can also reduce their personal risk by avoiding bites, for instance by using repellants and covering the skin. But experience shows that it's nearly impossible to control an outbreak using these measures alone.

**What's the outlook?**

- Yellow fever can never be eradicated because it occurs in monkeys. The virus will continue to spill over into the human population from time to time. That really shouldn't be a problem, because we have vaccines to prevent outbreaks or stop them in their tracks. Yet big epidemics still happen.

- The 2016 outbreak in Africa was a clear warning sign about the dangers. Many millions of people in areas at risk have not been vaccinated and are vulnerable. *Aedes aegypti*, the mosquito that causes urban transmission, is
omnipresent in many tropical mega-cities. Combined with the very modest vaccine supply, some experts argue that yellow fever is a ticking time bomb.

Resources

[Extensive information on yellow fever](#) from the World Health Organization.

A [paper in the New England Journal of Medicine](#) that explains the problem with yellow fever vaccines and argues that the global stockpile should be increased.


The [story](#) of Philadelphia's terrible yellow fever epidemic in 1793.