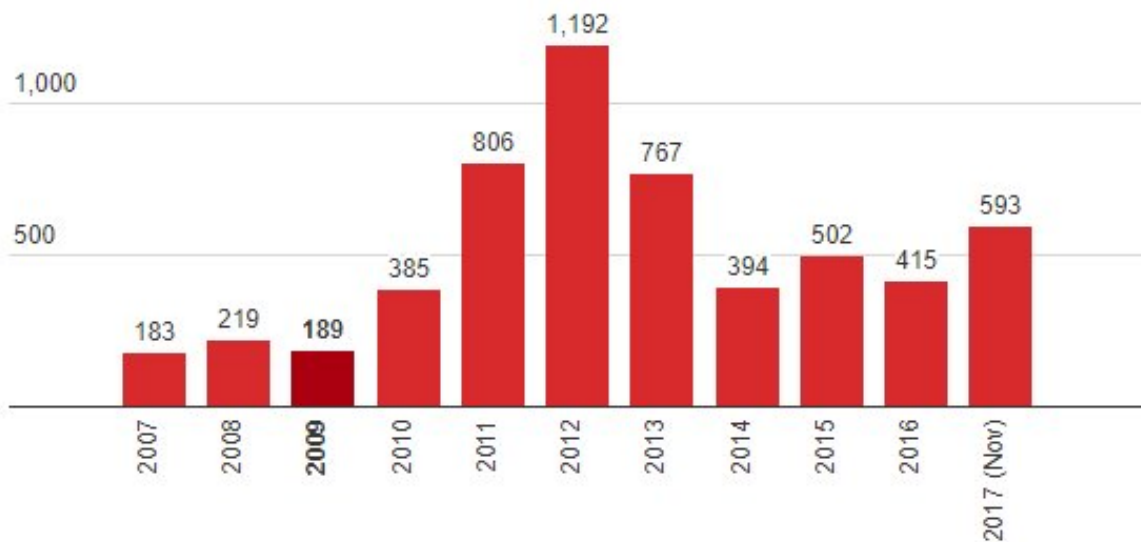


# Indonesia's diphtheria outbreak: problems in vaccination and antibiotics efficacy

December 12 2017, by Kambang Sariadji

Indonesia's diphtheria cases



2016 data from *Profil Kesehatan Indonesia 2016*

Source: [Situasi Imunisasi Indonesia](#)

Indonesia is seeing an outbreak of diphtheria, sparking fear among the people and the government. The bacteria, that causes a thick covering in the back of the throat, have infected hundreds and spread quickly not only to regions with limited health service but also to the country's

[capital](#) Jakarta, where health services are much better.

Between January and November 2017, the government has [recorded 593 diphtheria](#) cases, spread across 95 regencies in 20 provinces. The death toll [has reached 32](#). The World Health Organization data on [diphtheria](#) shows that [the number of cases in Indonesia has fluctuated since the 1980s](#).

What caused the increase in diphtheria cases? And how did it spread to Jakarta, West Java and Banten? These questions need scientific answers to allow the government and the public to take the right measures. It is not accurate to say the situation is caused by a singular factor.

Only about [75% of Indonesian children](#) have been vaccinated against diphtheria. The efficacy of antibiotics to fight the disease is also decreasing. These, among others, may be factors that caused the outbreak.

## **Antibiotic resistance**

My team and I carried out [a research in 2015 about patterns of antibiotics resistance](#) against diphtheria bacteria. We found 84% susceptibility pattern against the bacteria in penicillin and 91.2% susceptibility in erythromycin. The antibiotics susceptibility pattern shows the effectiveness to kill the bacteria.

Both penicillin and erythromycin are antibiotics to treat diphtheria. Our research shows that the susceptibility of both antibiotics have decreased. In a 1982 research by [Robert C. Rockhill](#) at the country's largest state hospital, Cipto Mangunkusumo, the susceptibility of ampicillin, a type under penicillin, and erythromycin were 100%.

Indonesia needs more research to improve the treatment of diphtheria.

Between 2007 and 2012, Indonesia saw an increase in diphtheria cases. In 2007, [Indonesia recorded 183 cases. It peaked in 2012 with 1,192 cases](#). The number of cases has been decreasing, but still hovers at the hundreds.

The Health Ministry's data for 2017 shows [people of different ages have contracted diphtheria](#). Diphtheria mostly infect children but when it hit adults, the impact could be more fatal.

## Incomplete immunisation

Diphtheria is a life-threatening communicable disease that spreads through air containing [Corynebacterium diphtheriae](#). The bacteria attacks the upper respiratory system, leading to symptoms such as high fever, sore throat, difficulties in swallowing, and shortness of breath.

The bacteria can also spread through spits and coughs and contaminated objects. When they enter the body, they release toxins. The toxins spread through the blood and can cause damage in the body system, especially the heart and nervous system. This can lead to death.

That's why when the government finds even just one diphtheria case, it has to announce it as an "extraordinary" situation.

According to data from the 2013 [Basic Health Research](#), the diphtheria, pertussis, and tetanus [\(DPT\) immunisation](#) coverage for children between 2 and 6 year old in Indonesia was only 75.6%. The ideal coverage is above 90%. This means 24.6% of Indonesian children have yet been vaccinated against the three diseases.

The Basic Health Research in 2013 also shows provinces with low coverage of DPT plus Hepatitis B immunisation: Papua (40.8%), Maluku (53.8%), and Aceh (52.9%). The low immunisation coverage

creates concerns on the spread of diseases preventable by immunisation.

However, data from the Information and Data Centre at the Health Ministry published in 2016 shows "routine data" taken annually from 2007 to 2015 shows a different, higher coverage data in 2013: [99.3%](#). With that kind of coverage, incidences of diphtheria should have been scarce.

The difference in data is caused by different methods of data collection. Nevertheless, the increasing number of cases from year to year means we need to look closely at the effectiveness of DPT vaccines.

## **Vaccine distribution and people's mobility**

We also need to evaluate the distribution pattern of vaccines from the central government to the regions by looking at storage temperature and transportation conditions. Once the vaccines lose their potency, it is irreversible; the vaccines would not yield results as expected. Vaccines are very sensitive to heat, and some also to freezing temperature.

Other things to take into account is patterns of population mobility from diphtheria outbreak regions like East Java to Banten and Jakarta and vice versa. The ministry's data say [63% of 502 diphtheria cases in Indonesia in 2015 were in East Java](#).

DPT immunisation is the right step to preventing wider spread of diphtheria. However, an immunised person is not necessarily free from diphtheria bacteria. He or she may be protected from the bacteria but they still can be vessels that spread the bacteria.

## **Non-medical factors and people's view of vaccines**

Apart from medical factors, there are others causing the increase of incidence:

1. Many parents do not want to deal with side effects of DPT immunisation, including the fever.
2. Densely populated neighbourhoods and houses allow for faster spread of the disease.
3. The news about [fake vaccines in June 2016](#) still affect some parents trust on vaccines even though the government has taken measures by conducting re-immunisation.
4. Some parents who have lower education level sometimes neglect the importance of good sanitation and immunisation schedule.
5. Lack of healthy lifestyle education in schools make students vulnerable to diphtheria infection.
6. Some parents believe that vaccines are prohibited under Islamic law (haram). The Indonesian Ulema Council (MUI) has countered this, saying that [vaccines are not haram](#).
7. Some believe that vaccines are not necessary as immunity is present in every one, and that the important thing is to maintain a healthy lifestyle.

## Diphtheria treatment

Treating diphtheria needs anti-diphtheria serum and antibiotics. The serum and antibiotics are complementary because each has its own function. The serum neutralises diphtheria toxins while antibiotics eliminate the bacteria. The serum itself cannot neutralise toxins that have spread.

That's why anti-diphtheria serum has to be taken at the outset, or within three days, of the symptoms. Delays in giving the serum would increase the risk of complications and deaths.

When a case is diagnosed, the availability of the serum is crucial to save the patient. Even then, the patient is still in danger as for some resistant patients, the antibiotics may not be effective to fight the bacteria.

Diphtheria is a disease that has yet been eradicated. DPT immunisation is one way to prevent the spread of the disease but it cannot eradicate the [bacteria](#) when someone is infected.

Indonesia must evaluate the effectiveness of antibiotics to treat diphtheria while ensuring the stock and quick transportation of serum to improve diphtheria treatment in the country.

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