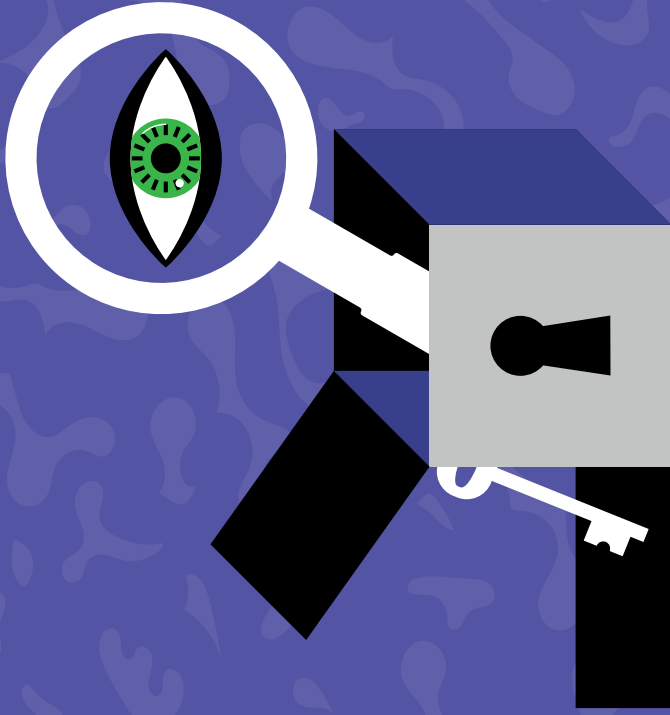




PUZZLE 8

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How to calculate the effectiveness of the meningococcal vaccine?

The effectiveness of a vaccine is its ability to reduce the number of cases among vaccinated people. The more effective a vaccine is, the more it reduces the number of illness among people exposed to the microbe.

To calculate vaccine effectiveness, we compare the attack rates of the disease among vaccinated versus unvaccinated people.

The **attack rate** is the **number of infections in a group of people exposed to the microbe over a given period**.

Calculation of vaccine effectiveness (VE) based on the attack rate (AR):

$$VE = 1 - \frac{AR \text{ vaccinated}}{AR \text{ unvaccinated}} \times 100 (\%)$$

For this exercise, we will consider the meningococcal vaccine, using rounded figures to simplify.

Among **unvaccinated** individuals, there are 10 cases per 1,000,000 people per year. The **attack rate** of meningococcal infection in **unvaccinated** people (over 1 year) is **10 per 1,000,000**.

Among **vaccinated** people, there is 1 case per 1,000,000 people per year. The **attack rate** of meningococcal infection in **vaccinated** people (over 1 year) is **1 in 1,000,000**.

What is the vaccine effectiveness?