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Measles leaves you vulnerable to a host of deadly diseases

19:00 07 May 2015 by [Debora MacKenzie](#)
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Measles is often painted as a trivial disease by [the anti-vaccination movement](#). It is not – it kills or causes brain damage in two or three out of every 1000 cases, even in wealthy countries. Here's another reason it isn't trivial: having measles destroys your immunity to other diseases – and some of those are far more deadly.

The upshot? Getting your child vaccinated will protect them from much more than just measles.

Some 650 children a year used to die from measles in the US. When mass vaccination came in after 1960, measles deaths plummeted. But oddly, so did childhood deaths from infectious disease generally, in every country where the measles vaccine was introduced. This has been a major mystery in public health: the vaccine was supposed to protect you from measles, and nothing else.

The measles virus is known to kill the white blood cells that have a "memory" of past infections and so give you immunity to them. It had been thought that those cells quickly bounce back, because new ones appear a week or two after someone gets over measles.

Immune amnesia

However, recent work in monkeys that have recovered from measles shows that these new memory cells only remember measles itself; the monkeys lose cells that recognise other infections. If humans get similar "immune amnesia" after measles, childhood deaths from infectious diseases should rise and fall depending on how many had measles recently, and how long the effect lasts, reasoned [Michael Mina](#) of Emory University in Atlanta, Georgia.

It looks as if they do. Mina and his colleagues used a complex statistical model to analyse child mortality records from the US, UK and Denmark in the decades before and after measles vaccination began. They found that infectious disease deaths did rise and fall depending on measles cases. In all three places, the timing of this surge exactly matched what would be expected if immune amnesia after measles lasted on average 27 months. The biggest killer was pneumonia, followed by diarrhoeal diseases and meningitis.

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Vaccinating against measles just got even more important (Image: MOHAMMED HUWAIS/AFP/Getty Images)

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The effect was so large that in any given year, the number of children who died of infectious disease was clearly linked to how many measles cases there had been two to three years previously. When measles was common, the team calculates that it was implicated in around half of all childhood deaths from infectious disease.

Measles reset

So why did the immune amnesia last so long? When children are very young, their immune systems learn to remember and attack the pathogens they come across in their environment. The data from all three countries that Mina's team looked at showed that infections in toddlers started falling between ages 2 and 3, suggesting that it takes this long for them to become immune to enough pathogens to stay largely well.

This is so close to the duration of immune amnesia after measles, says Mina, that it suggests measles resets children's immunity to that of a newborn. They then have to be exposed to all those germs again in order to reacquire a level of immunity that would drive mortality rates down again.

If measles can wipe out a child's naturally acquired immunity, then it implies any immunity gained by being vaccinated would be wiped out too. "There is no reason to think it doesn't kill vaccine-induced memory cells as well," says Mina. The researchers want to study children who have had measles to see if they retain any immunity from previous vaccinations.

Ab Osterhaus of Erasmus University Medical Centre in Rotterdam, who was also involved in the study, says that because much anti-vaccine sentiment focuses on MMR (the vaccine for measles, mumps and rubella), some parents reject measles inoculation but accept the standard vaccines against diphtheria, typhoid and whooping cough, and perhaps other vaccines. If their children then get measles, this immunity could be destroyed. There is then a risk that they might not catch these other diseases until they are adults, when they are more severe.

Silver lining

There could be a silver lining. Many parents who reject vaccination do so because they believe having measles is healthier than being vaccinated against it. They might, however, reconsider if there's clear evidence that measles leaves a child vulnerable to pneumonia, meningitis or diphtheria.

Or not. "People who reject vaccines don't think in terms of evidence, so knowing this might not change their minds," says Paul Offit of the University of Pennsylvania, who fights vaccine denial. But then, he says, "people are compelled by fear more than reason". The prospect of a child losing its hard-won immunity to a host of threatening diseases might be the nudge some parents need to recognise that the measles vaccine is essential.

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