

# The Spread of Vaccine-Derived Polio

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › Since 2017, vaccine-derived poliomyelitis has been responsible for infecting and paralyzing more people than the wild virus. Although the Americas were declared polio-free in 1994, a New York man contracted polio and was paralyzed in 2022
- › Vaccine-derived poliovirus infections result from viral shedding from the oral polio vaccine, which is known to spread beyond the immunized person. In the early years, public health officials felt this would benefit the public
- › In nature, the weakened virus can replicate in an immunodeficient person and change to a form that causes paralysis, which is what is happening across the globe
- › Some experts believe the vaccine program should be ramped up to protect the population from a vaccine-derived virus, while others believe doing the same thing and expecting different results is "a recipe for failure"
- › Just five years before vaccine-derived cases of poliovirus overtook wild cases in number, the first outbreaks of acute flaccid myelitis (AFM) were reported in multiple global regions; some experts note this paralyzing condition may be triggered by skeletal muscle injury from a vaccine

The historical record of the enterovirus poliovirus traces as far back as 1580 B.C.<sup>1</sup> The modern record began in 1879 when the clinical effects of the poliovirus were first described by British physician Dr. Michael Underwood. By 1840, Dr. Jacob von Heine had developed the theory that the disease may be contagious. More than 50 years later in 1894, the first outbreak of infantile paralysis was documented in the U.S.

In 1938, the National Foundation for Infantile Paralysis was established and later became the March of Dimes. It would be nearly 20 more years before Dr. Jonas Salk developed the first injectable, inactivated polio vaccine in 1955. In 1961 Dr. Albert Sabin developed the live oral polio vaccine (OPV) and it rapidly became the vaccine of choice and has remained the vaccine of choice in developing countries.

The Global Polio Eradication Initiative<sup>2</sup> marks 1991 as the last case of wild polio infection in the Americas, 1997 as the last case of wild polio in the Western Pacific region, and 1998 as the last case of a child paralyzed by the wild poliovirus in the European region.

Yet, while the polio vaccine program appears to have significantly reduced wild poliovirus, outbreaks continue to occur, suggesting it may be time to rethink the polio vaccine program.

## **Vaccine-Derived Polio Challenges Old Protocols**

The Global Polio Eradication Initiative<sup>3</sup> was launched in 1988 following the World Health Assembly's resolution to eradicate the disease. They have public and private partners including the World Health Organization, Rotary International, the U.S. CDC, the Bill & Melinda Gates Foundation, and GAVI.<sup>4</sup>

Yet, after more than 30 years, polio continues to infect and paralyze people — but it isn't the wild virus doing all the damage. The vaccine program has been an unsuccessful multibillion-dollar fight. Dr. Paul Offit, director of the Vaccine Education Center at Children's Hospital of Philadelphia, says eradication may never happen because the viruses are “smarter than we are.”<sup>5</sup>

In 1994, the Americas were declared polio-free, but a young man in New York contracted the virus and was paralyzed in 2022.<sup>6</sup> The challenge is the vaccine-derived poliovirus. The CDC<sup>7</sup> describes how the weakened virus from an OPV can replicate in an immunodeficient individual and “revert to a form that causes illness and paralysis.”

Health officials say this is more likely to happen when the virus circulates in under- or non-immunized populations.

The Global Polio Eradication Initiative<sup>8</sup> describes the OPV program as having “brought the wild poliovirus to the brink of eradication.” Unfortunately, the virus refuses to go over the edge. Instead, it is doing exactly what the CDC described and has reverted to a more dangerous virus that public health experts have found in the U.S. and 15 European countries,<sup>9</sup> including the U.K.<sup>10</sup>

The virus spreads through sewage in areas with poor sanitation. But that's not the only place it's been found. According to NPR,<sup>11</sup> the poliovirus has been detected in wastewater in Rockland and Orange Counties, New York, and New York City. Offit told NPR that health officials were aware that the virus in the OPV could mutate but the vaccine campaigns continued anyway. He explained:

*"We were seduced by the fact that it was cheap. It caused contact immunity. It was easy to give. And so we thought, 'We can eliminate this disease in the world.' We released the dragon, and the dragon was the circulating vaccine-derived poliovirus."*

## **Vaccine-Induced Polio Has Replaced the Wild Virus**

According to NPR,<sup>12</sup> in some places of the world, only 5% of children are up to date on their childhood immunizations. Those are the areas where the less expensive oral polio vaccine is more commonly used and where many of the current outbreaks are occurring.

In the early years, public health officials felt the spread of the weakened poliovirus was a benefit of using the OPV. They hoped it would immunize the unvaccinated children who were exposed.<sup>13</sup> But instead of helping to eradicate the disease, the weakened virus mutated, regained strength and is now just as dangerous as the wild-type poliovirus.

In 2022, the WHO reported 30 cases of confirmed wild-type polio infections<sup>14</sup> but there were 791 cases of vaccine-derived polio,<sup>15</sup> which they reported as Acute Flaccid Paralysis (AFP).<sup>16</sup> Using data from the World Health Organization, NPR produced<sup>17</sup> an

interactive bar graph that demonstrates how vaccine-derived cases of poliovirus outnumber cases of the wild virus, most significantly starting in 2017 during an outbreak in Syria.

The injected polio vaccine does not shed the virus in the same way that the OPV does. However, it's also more expensive and out of reach for most developing countries. In 2021, another oral polio vaccine was developed and introduced, which experts hope will be less likely to mutate. Aiden O'Leary is the director for the Global Polio Eradication Initiative, and true to the stated focus of many of the Initiative's partners, O'Leary says:<sup>18</sup>

*"But the backbone of our approach is really this house-to-house coverage [with oral vaccine]. It has been demonstrated over time that this is the best means of ensuring that we're able to reach each and every child. And that is fundamentally the key to actually achieving the goals we've set for ourselves."*

In other words, the Global Polio Eradication Initiative's answer to vaccine-derived poliovirus is more vaccines. Konstantin Chumakov, former associate director for research at the FDA Office of Vaccines, disagrees, telling NPR: "If we keep doing the same thing, expecting different results, that's a recipe for failure."

Zulfiqar Bhutta, founding director of the Institute for Global Health and Development at the Aga Khan University in Pakistan, agrees. House-to-house campaigns cannot continue indefinitely. He notes that people have asked "Why are you coming every few months with these vaccine doses that we have already had and then kids are getting the paralytic polio despite the vaccine?"<sup>19</sup>

Yet, Chumakov also believes that stopping the vaccine program is also not the answer. Even if polio is eradicated from the planet, Chumakov warns that polio is easily manufactured in a lab and could be used as a bioweapon. He thinks the polio vaccine cannot be stopped, "No, they will have to continue forever, everywhere, indefinitely."<sup>20</sup>

## **Acute Flaccid Myelitis Is a Polio-Like Illness**

Just five years before vaccine-derived cases of poliovirus overtook wild cases in number, the first outbreaks of acute flaccid myelitis (AFM) were reported across multiple global regions.<sup>21</sup> According to the CDC,<sup>22</sup> the condition causes the body to become weak, with loss of muscle tone and reflexes. Some people experience difficulty moving their eyes, difficulty with swallowing or pain in the arms, legs, neck or back.

AFM can cause life-threatening respiratory failure and serious neurological complications. It is vital if you or your child develops these symptoms that you seek medical attention immediately. There is no cure or treatment for the condition.<sup>23</sup> The goal is to manage symptoms and provide respiratory support.

This polio-type illness mainly affects children. In 2014, the CDC<sup>24</sup> began tracking cases in the U.S. and recorded 120 confirmed cases in 34 states. That number jumped to 153 cases in 2016. Between 2014 and 2019, the virus appeared to infect many more people every other year. In 2018 there were 238 total confirmed cases in 42 states. Since then, the number has stayed at less than 50, with 28 confirmed cases in 2021 and 44 in 2022.

The CDC formed a task force in 2018<sup>25</sup> to assist in the effort to define the cause and improve patient outcomes. However, according to the CDC website, the task force page was last updated on September 30, 2021, and the activities listed are the clinical treatment and etiology goals but no accomplishments.

The move to create the task force was likely prompted in part by criticism from parents and scientists for the CDC's lack of an effective response.<sup>26</sup> While the number of cases has fallen to below 50 for four consecutive years, as we have seen with vaccine-derived poliovirus infections, this is not a guarantee that the number will stay low.

## **Could Vaccines Provoke AFM?**

In a paper published in the BMJ, Dr. Allan S. Cunningham suggests we may need a new approach to making vaccine recommendations.<sup>27</sup> He was referring to the outbreak of AFM, which at the end of 2015 totaled 142 cases in the previous two years.

He suggested a phenomenon known as provocation poliomyelitis, which describes an increased risk of neurological complications known to occur when a person infected with poliovirus receives an injury to a skeletal muscle. He suggests the injury could derive from an injection from a vaccine. As noted in the Journal of Virology in 1998:<sup>28</sup>

*"Skeletal muscle injury is known to predispose its sufferers to neurological complications of concurrent poliovirus infections. This phenomenon, labeled 'provocation poliomyelitis,' continues to cause numerous cases of childhood paralysis due to the administration of unnecessary injections to children in areas where poliovirus is endemic.*

*Recently, it has been reported that intramuscular injections may also increase the likelihood of vaccine-associated paralytic poliomyelitis in recipients of live attenuated poliovirus vaccines."*

Interestingly, in less than 1% of cases, poliovirus will invade the central nervous system and cause paralysis.<sup>29</sup> Most cases produce a mild illness with a sore throat, low-grade fever, fatigue, nausea and other flu-like symptoms that disappear in 10 days. In some cases, polio can occur with relatively no symptoms. This means that some people receiving vaccinations could have an underlying polio infection at the time and not even know it.

The poliovirus is only one type of enterovirus. There are more than 100 non-polio enteroviruses,<sup>30</sup> most of which cause mild illness. However, some can infect the nervous system and cause paralysis. Because they are one of the most prevalent viruses in the world,<sup>31</sup> it's likely that some children receiving vaccinations are infected at the time of injection, possibly without symptoms or only mild fever or flu-like symptoms.

Is it possible that provocation poliomyelitis could occur in children vaccinated while infected with a non-polio enterovirus? It's a question that deserves a closer look. As Cunningham explained:<sup>32</sup>

*"PP [provocation poliomyelitis] was most convincingly documented by Austin Bradford Hill and J. Knowelden during the 1949 British polio epidemic when the*

*risk of paralytic polio was increased twenty fold among children who had received the DPT injection. Similar observations were made by Greenberg and colleagues in New York City; their literature review cited suspected cases as far back as 1921.*

*AFM may result from a direct virus attack on the spinal cord, or by an immune attack triggered by a virus, or by something else. If a polio-like virus is circulating in the U.S., the possibility of its provocation by one or more vaccines has to be considered."*

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