

# Why the Furor about Polio?

Samuel Amo-Tachie.<sup>1</sup> 

## Abstract

Poliomyelitis is one of such diseases as measles and dracunculiasis that can be eradicated, because it meets the criteria for eradicable diseases: being infectious, having humans as major host, effective vaccines or treatment available for their control, and the availability of political and financial support for the eradication efforts. Ghana, with the rest of the world has already come far in the fight against polio, by reducing its incidence drastically (to zero as of now). The disease can only be prevented but not reversible, once infection results in paralysis and leaves victims permanently maimed, almost invariably reducing their quality of life. The recent outbreak (caused by a circulating vaccine-derived virus of the type 2 strain) was a call to pay more attention to the disease in order to realize the global aim of its elimination. All the attention needed by the disease is center around vaccination, which indeed was the tool used in combating the outbreak that ensued in Ghana.

**Key Words:** Poliomyelitis; Vaccine; Poliovirus (Source: MeSH-NLM).

## The Experience

As final year medical students, we were privileged to visit less privileged districts in the country, to observe the health management systems there. I happened to be in one such district (Tarkwa in the Western Region of Ghana) with a colleague during which time some cases of polio were recorded during our community outreach. Coming so close to such cases of public health importance involving children caused me heartbreak, disappointment and frustration. Even though we were not privy to the details of the affected children, the atmosphere felt like that of a lost major battle whenever we met with the District Health Management Team (*Figure 1*).

**Figure 1.** Meeting with the District Health Management Team at Tarkwa.



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Poliomyelitis is a highly contagious, disabling, and potentially life-threatening disease of the nervous system.<sup>1</sup> It has several manifestations, most common of which is paralysis, when it affects the spinal cord. Affecting mainly children under 5, it usually results in irreversible paralysis. The associated paralysis and limb deformities have made it a deplorable morbidity. Researches necessitated by this epidemic in developed countries led to the development of the polio vaccines, which have dramatically decreased its incidence.<sup>2</sup> This disease has neared eradication, as active transmission persists in just a couple of countries—Afghanistan and Pakistan.<sup>3</sup> Ghana follows the Global Polio Eradication Initiative (GPEI) and had been polio-free for about a decade, until August 2019 when a case involving a 2-year old girl was confirmed in the North-East Region.<sup>4</sup> About 30 more cases were confirmed and investigations revealed it was a circulating vaccine-derived poliovirus (cVDPV). Three of these 30 national cases were registered in the region I visited.

## Significance

Poliomyelitis meets the criteria for eradicable diseases: being infectious, having humans as major hosts, effective vaccines or treatment available for their control, and the availability of political and financial support for eradication efforts.<sup>5-6</sup> The disease can only be prevented but not reversible, once infection results in paralysis and leaves victims permanently injured, almost invariably reducing their quality of life. Given that most cases occur in low socioeconomic settings as the one I visited,<sup>7</sup> these unfortunate children are unable to achieve their full potentials because they do not have access to rehabilitation facilities.

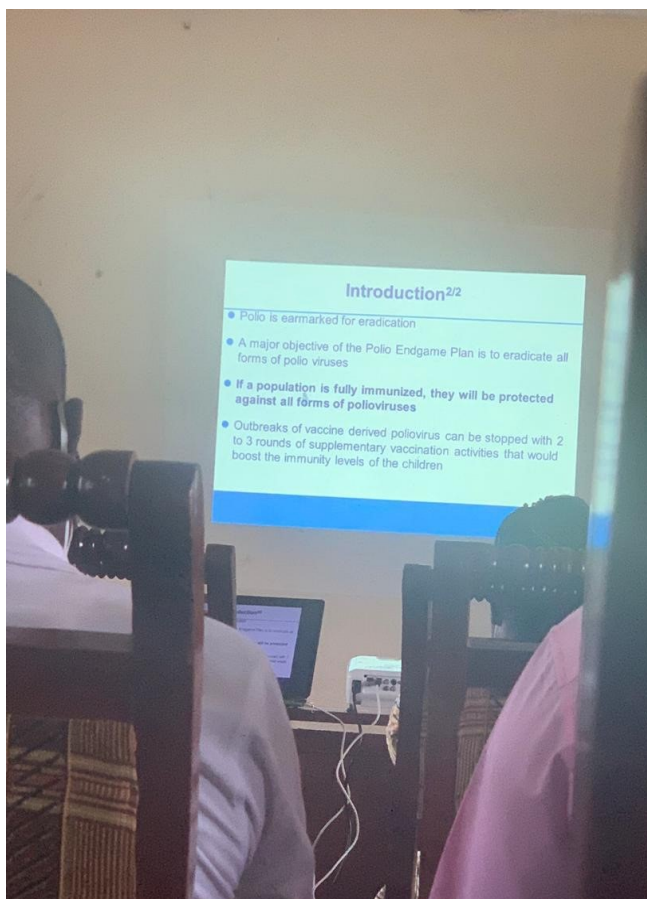
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Unchecked outbreaks could abate decades of expenditure channeled into its eradication—a major reason for furor in the public health world. Again, immunity to one strain of the virus does not confer immunity to another.<sup>8</sup> This is what gave room for the emergence of the cVDPV (in Ghana) as we shifted from the use of the trivalent oral polio vaccine (OPV) to the bivalent one, which excluded the type 2 strain. There is history that should neither be relived nor forgotten—when up to 75,000 children were paralyzed from this infection all across the continent by 1996.<sup>7</sup>

The GPEI guidelines stipulate minimum response standards following notification of a new poliovirus, or the spread of poliovirus to a new geographic area or population. These include: detailed investigation and risk assessment, enhanced surveillance to increase sensitivity and confidence that any ongoing person-to-person spread of poliovirus is quickly detected, and vaccination response.<sup>9</sup> These steps are effective and comprehensive; following them has saved many countries including Ghana. During my stay at Tarkwa, a mop-up vaccination exercise was being conducted to help curb the outbreak (this was a nationwide program) for which my colleague and I attended orientation programs organized for vaccination volunteers (*Figure 2*).

**Figure 2.** At the Orientation for Vaccination Volunteers.



### About the Virus and the Outbreak

The poliovirus is an enterovirus surrounded by a protein coat and no lipid envelope (making it resistant to harsh gastrointestinal conditions) with 3 strains: types 1, 2 and 3; with type 1 accounting for most cases. It is termed wild-type when acquired naturally and vaccine-derived when related to vaccinations. Administration of the OPV allows polioviruses to replicate for a while in the gut of the recipients and shed in stool, which is normal. Following eradication of the type 2 strain (and its removal from successive vaccines in 2016),<sup>10</sup> the subsequent generation of children benefited from the herd immunity generated by the previous generation (who had received trivalent OPV) against type 2. With time however, the efficacy of this herd immunity was lost, while some of those who had received the trivalent oral vaccine still shed the type 2 strain in their stool. Furthermore, some of the children had not received any polio vaccination. Children who were immunologically naive to this strain got exposed via the faecal-oral route resulting in some developing severe polio, which could also be spread (resulting in the cVDPV). Successful spread of the cVDPV was facilitated by its mutability<sup>13</sup> and insanitary practices, such as improper hand washing. Environmental sanitation officers performed laboratory testing on the sewage of some of the affected communities and found traces of the type 2 strain in the sewage (indicating active shed in faces). This explained the mechanism of the outbreak which was followed by mass immunization with OPV for Type 2. Following this exercise, there have been no new recorded cases, proving the effectiveness of vaccination.

I was amazed at the sort of stir a disease like polio could cause given the timing of this outbreak (which was in the 3<sup>rd</sup> quarter of 2020 shortly after lockdown restrictions for Covid-19 were eased). This is because for that period of time it felt like even the much feared and relatively novel COVID-19 had been muffled amid the stir. We had just been allowed back to school but at that moment paid less attention to the pandemic and focused on protecting the children endangered by the epidemic through the vaccination exercises. It was a breath of fresh air getting our minds off daily news on the pandemic while actually imparting the lives of children.

### Conclusion

Polio is a global menace that has taken lives and maimed children for life. The worldwide effort that has culminated in its near-elimination could be annulled by even a hint of negligence to the threatening epidemic. Many other African countries having experienced this cVDPV tragedy, polio threatens to leave another dent in history. The furor about polio is not just a minor battle but a potential global crisis. Vaccination is a simple but concrete means of its complete eradication. Amendments to regular vaccination schemes in the face of such crises as well as implementation of all indicated regulations of the GPEI are all it takes to end it all. We are near the pinnacle of a global achievement and need not rest now to climax our fight.

## Summary – Accelerating Translation

Polio is a disease that causes paralysis of children especially below age 5. It is uncommon these days because of mass immunisations done by various countries against the poliovirus which indeed is a global effort to eradicate the disease. An outbreak happened in a number of countries, including Ghana, which was caused indirectly by vaccines. It was an indirect cause of the outbreak because administration of the vaccines did

not cause disease, but the resurgence of an old strain of the virus which existed in older versions of the vaccine. This old strain was being shed by people who had received the older vaccines living in unhygienic conditions which facilitated the spread (as the virus is spread from stool to mouth). This outbreak caused reason for concern because polio is a devastating disease that is very preventable and even near eradication. This article addressed the depth of seriousness of the situation and why this disease should not be neglected but fought to eradication.

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