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Contributor Role	Role Definition	Authors					
		1	2	3	4	5	6
<b>Conceptualization</b>	Ideas; formulation or evolution of overarching research goals and aims.	X					
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12 **Discussion Points: Has the world really overcome the menace that is polio? Have we unknowingly**  
13 **tagged it a forgotten disease?**

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1 **ABSTRACT**

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

11

12 **Key Words:** Poliomyelitis, vaccine, poliovirus

13

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1 **INTRODUCTION.**

2

3 **The Experience**

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

10

11 Poliomyelitis is a highly contagious, disabling, and potentially life-threatening disease of the nervous system.<sup>1</sup> It  
12 has several manifestations, most common of which is paralysis, when it affects the spinal cord. Affecting mainly  
13 children under 5, it usually results in irreversible paralysis. The associated paralysis and limb deformities have  
14 made it a deplorable morbidity. Researches necessitated by this epidemic in developed countries led to the  
15 development of the polio vaccines, which have dramatically decreased its incidence.<sup>2</sup> This disease has neared  
16 eradication, as active transmission persists in just a couple of countries—Afghanistan and Pakistan.<sup>3</sup> Ghana  
17 follows the Global Polio Eradication Initiative (GPEI) and had been polio-free for about a decade, until August  
18 2019 when a case involving a 2-year old girl was confirmed in the North-East Region.<sup>4</sup> About 30 more cases  
19 were confirmed and investigations revealed it was a circulating vaccine-derived poliovirus (cVDPV). Three of  
20 these 30 national cases were registered in the region I visited.

21

22 **Significance**

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

29 Unchecked outbreaks could abate decades of expenditure channeled into its eradication—a major reason for  
30 furor in the public health world. Again, immunity to one strain of the virus does not confer immunity to another.<sup>7</sup>

31 This is what gave room for the emergence of the cVDPV (in Ghana) as we shifted from the use of the trivalent  
32 oral polio vaccine (OPV) to the bivalent one, which excluded the type 2 strain. There is history that should  
33 neither be relived nor forgotten—when up to 75,000 children were paralyzed from this infection all across the  
34 continent by 1996.<sup>8</sup>

35

36 The GPEI guidelines stipulate minimum response standards following notification of a new poliovirus, or the  
37 spread of poliovirus to a new geographic area or population. These include: detailed investigation and risk  
38 assessment, enhanced surveillance to increase sensitivity and confidence that any ongoing person-to-person  
39 spread of poliovirus is quickly detected, and vaccination response.<sup>9</sup> These steps are effective and

1 comprehensive; following them has saved many countries including Ghana. During my stay at Tarkwa, a mop-  
2 up vaccination exercise was being conducted to help curb the outbreak (this was a nationwide program) for  
3 which my colleague and I attended orientation programs organised for vaccination volunteers.  
4

### 5 **About the virus and the outbreak**

6 The poliovirus is an enterovirus surrounded by a protein coat and no lipid envelope (making it resistant to harsh  
7 gastrointestinal conditions) with 3 strains: types 1, 2 and 3; with type 1 accounting for most cases. It is termed  
8 wild-type when acquired naturally and vaccine-derived when related to vaccinations. Administration of the OPV  
9 allows polioviruses to replicate for a while in the gut of the recipients and shed in stool, which is normal.  
10 Following eradication of the type 2 strain (and its removal from successive vaccines in 2016),<sup>10</sup> the subsequent  
11 generation of children benefited from the herd immunity generated by the previous generation (who had  
12 received trivalent OPV) against type 2. With time however, the efficacy of this herd immunity was lost, while  
13 some of those who had received the trivalent oral vaccine still shed the type 2 strain in their stool. Furthermore,  
14 some of the children had not received any polio vaccination. Children who were immunologically naive to this  
15 strain got exposed via the faecal-oral route resulting in some developing severe polio, which could also be  
16 spread (resulting in the cVDPV). Successful spread of the cVDPV was facilitated by its mutability<sup>13</sup> and insanitary  
17 practices, such as improper hand washing. Environmental sanitation officers performed laboratory testing on  
18 the sewage of some of the affected communities and found traces of the type 2 strain in the sewage (indicating  
19 active shed in faeces). This explained the mechanism of the outbreak which was followed by mass immunization  
20 with OPV for Type 2. Following this exercise, there have been no new recorded cases, proving the effectiveness  
21 of vaccination.  
22

23 I was amazed at the sort of stir a disease like polio could cause given the timing of this outbreak (which was in  
24 the 3<sup>rd</sup> quarter of 2020 shortly after lockdown restrictions for Covid-19 were eased). This is because for that  
25 period of time it felt like even the much feared and relatively novel Covid-19 had been muffled amid the stir. We  
26 had just been allowed back to school but at that moment paid less attention to the pandemic and focused on  
27 protecting the children endangered by the epidemic through the vaccination exercises. It was a breath of fresh  
28 air getting our minds off daily news on the pandemic while actually imparting the lives of children.  
29

### 30 **Conclusion**

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

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26 **SUMMARY- ACCELERATING TRANSLATION**

27  
28 Polio is a disease that causes paralysis of children especially below age 5. It is uncommon these days because  
29 of mass immunisations done by various countries against the poliovirus which indeed is a global effort to  
30 eradicate the disease. An outbreak happened in a number of countries, including Ghana, which was caused  
31 indirectly by vaccines. It was an indirect cause of the outbreak because administration of the vaccines did not  
32 cause disease, but the resurgence of an old strain of the virus which existed in older versions of the vaccine.  
33 This old strain was being shed by people who had received the older vaccines living in unhygienic conditions  
34 which facilitated the spread (as the virus is spread from stool to mouth). This outbreak caused reason for  
35 concern because polio is a devastating disease that is very preventable and even near eradication. This article  
36 addressed the depth of seriousness of the situation and why this disease should not be neglected but fought to  
37 eradication.

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1 **FIGURES AND TABLES.**

2 **Figure 1. Meeting With The District Health Management Team At Tarkwa**

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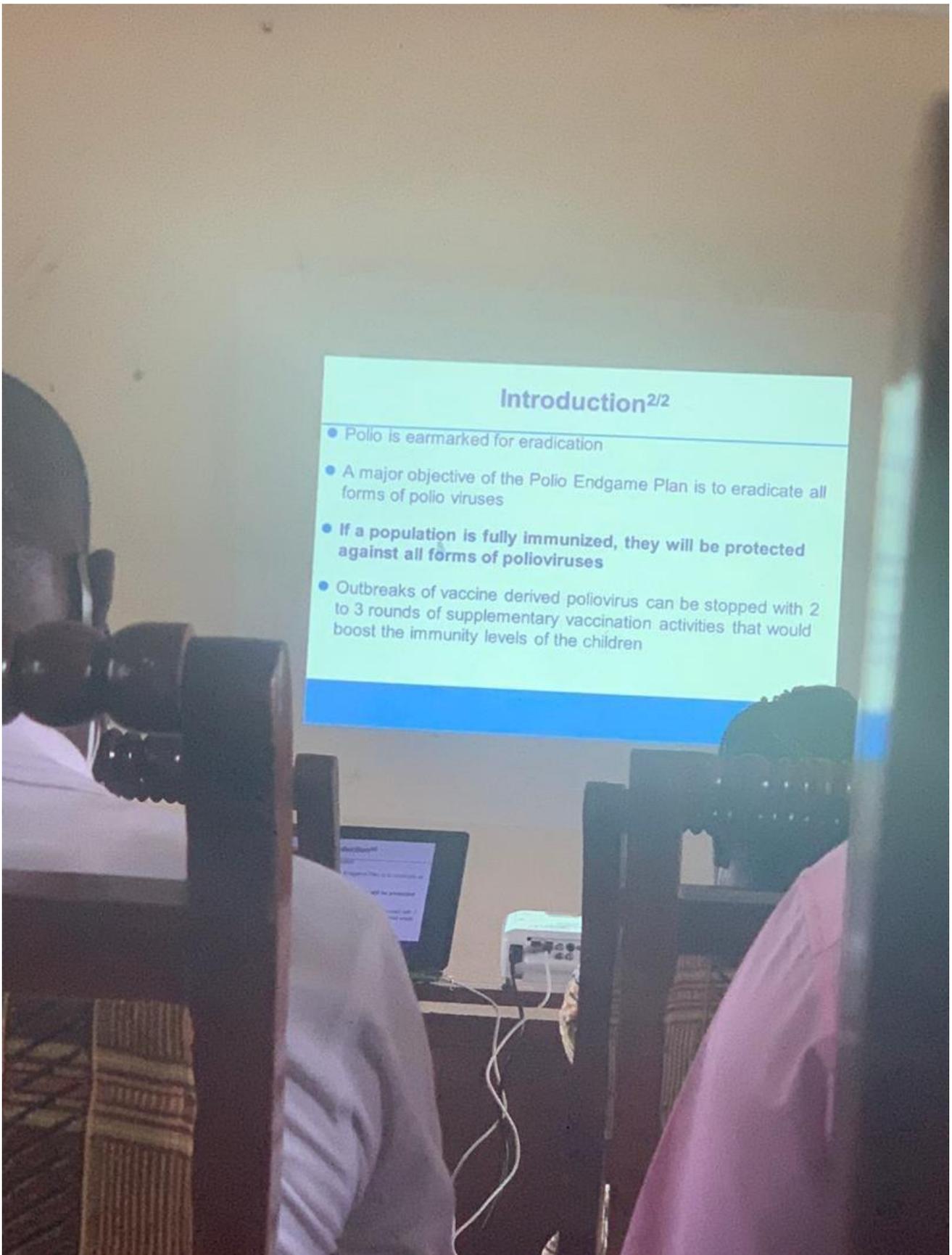
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1 **Figure 2. At The Orientation For Vaccination Volunteers**



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