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Poliomyelitis eradication remains a challenge in Africa

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During the last two decade, twelve wild type 1 poliovirus genotypes have been characterized in Africa. Several distinct clusters have been identified within some of them and appeared to be segregated geographically. This distribution could represent newly emerging genotypes and independent sustained circulation of these lineages or cross border transmission between countries of a single genotype followed by a different natural evolution in each country. Concurrent circulation of more than one poliovirus genotype was seen in Nigeria, Togo, Central Africa Republic and South Africa. The present study which has generated a meaningful overview of the endemic circulation of wild type 1 poliovirus in Africa, could be a basis for further evaluation of the impact of mass vaccination campaigns on wild type 1 poliovirus.

Key words: Poliovirus; poliomyelitis, poliovirus, molecular epidemiology.

INTRODUCTION

During the last two decade, most of the wild polioviruses isolated in Africa were found to be type 1. Wild type 3 have been isolated in CAR in 1995 (Gouandjika et al., 1995) and in 1996 and 1997. Wild type 3 viruses have been also found in Cameroon (1993), Togo (1996) and Madagascar (1995). Wild type 2 was isolated in Madagascar during 1980 and recently in West Africa, Benin (1996) and Liberia (1998) (Anonymous, 1999b).

Many countries in Southern Africa have for several years reported both high levels of OPV-3 coverage in children under 1 year of age and very low or zero incidence of poliomyelitis. WHO suggests that Southern Africa may be emerging as a polio free zone. (Anonymous, 1994; Schoub et al., 1995; Biellik, 1997). However, in 1996, 16 countries including four of the largest and epidemiologically most important countries, Angola, Ethiopia, Nigeria and Democratic Republic of Congo (DRC) reported that less than 50% of children were routinely immunized 3 doses of OPV (Anonymous, 1998a, 1999c). Moreover, there are no available data or recent isolates for many countries such as Libya, Mauritania, Mali, Chad and Somalia. The largest numbers of poliomyelitis cases due to wild type 1 PV are being reported in these areas (Anonymous, 1999a), such as in Angola (Izurieta et al., 1997), in Central Africa Republic (CAR) (Gouandjika et al., 1995), in DRC (Lambert et al., 1995) and despite intensive national vaccination campaigns following the 1993 epidemic in Tanzania and Zambia (Mpabalwani et al., 1996).

To date, 12 major wild type 1 PV genotypes have been characterized in Africa (Figure 1). The West African genotype in circulation since early eighteen has the widest distribution. This genotype is encountered from the western beach of Senegal to Southern Africa. Earlier isolates from Cameroon and Senegal (1970-77) described by Rico-Hesse et al., 1987 fall within this genotype, with the result that this genotype could be circulating earlier than 1980. Several distinct clusters have been identified within this genotype and appeared to be segregated geographically, representing newly emerging genotypes and independent sustained circulation of these lineages. This distribution could also suggest cross border transmission between countries of a single genotype followed by a different natural evolution in each country (Anonymous, 1998b, 2000c). Dissemination of this geno-

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Abbreviations: WHO, World Health Organization; **RFLP,** restriction fragment length polymorphism; **PV,** poliovirus; **NIDs,** national immunization days.

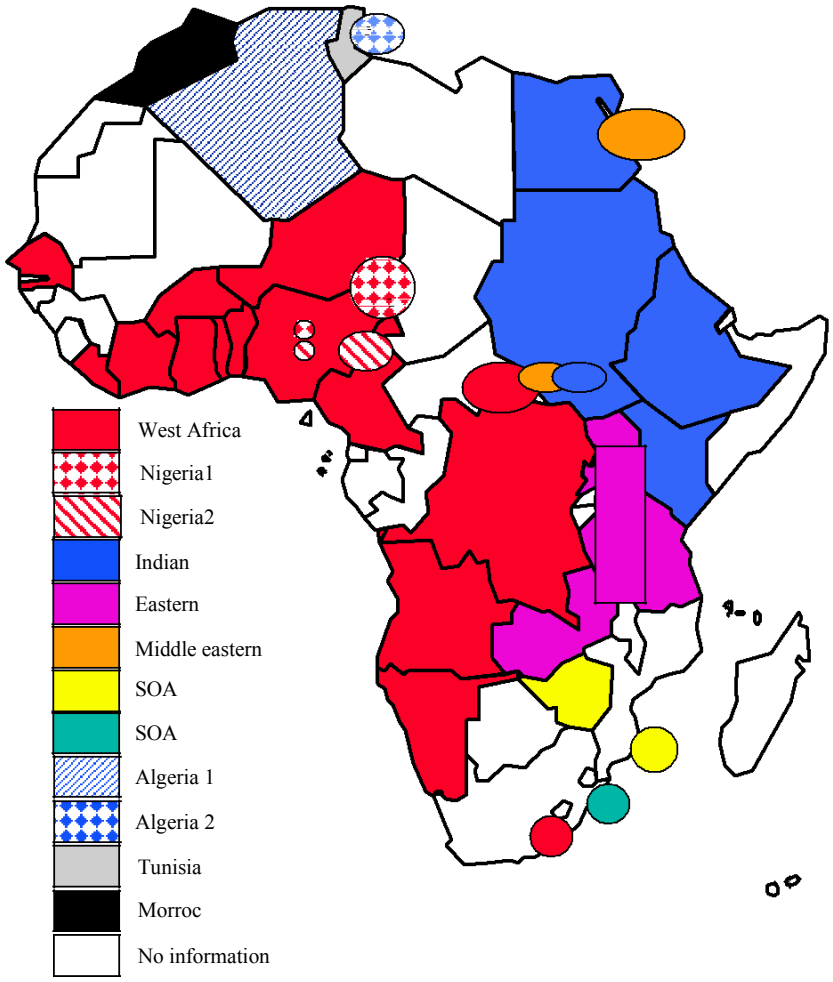

Figure 1. Puzzle of poliovirus type 1 genotypes in Africa

type could be explained by the mobility of the population from poorest region to the rich ones.

The presence within a single country of several reservoirs capable of independent transmission of polioviruses for prolonged periods of time, as evidenced by concurrent circulation of more than one PV genotype, was seen in Nigeria, Togo, CAR and South Africa. In Nigeria and Togo, 3 genotypes, the West African, Nigeria 1 and Nigeria, 2 genotypes were co circulating between 1993 and 1997. It is quite difficult to determine whether these genotypes circulated in different geographical niches or whether all three circulated in the same communities. In CAR, 2 other PV genotypes co circulated with the West African. The Indian genotype which corresponds to the genotype 4 described by Mulders et al. (1995) is most likely imported from Sudan to CAR. This genotype is probably introduced in Kenya from Sudan and such importation is the result of movements of large population due to political unrest (Morvan et al., 1997). The Middle Eastern genotype is probably imported from Egypt into CAR. In South Africa, 3 PV genotypes have been characterized. Except for West African genotype, the other genotypes seem to be located only in this region.

In Algeria, 2 independent genotypes have been isolated from 1982 to 1987. Isolates included in Algeria genotype 2 were isolating only in 1982-83. In DRC, 2 PV genotypes have been identified. The West African genotype was probably imported there by immigrant and the Eastern genotype. This last genotype has been in circulation in this region prior to 1987, because an isolate from Zaire before this year fall in this genotype. This suggests that this genotype was circulating for several years in central Africa and DRC was the source of importation into Uganda, Zambia and Tanzania. Like in West Africa, several distinct clusters have been identified within this genotype and appeared to be segregated geographically, representing newly emerging genotypes and independent sustained circulation of these lineages.

In many countries in Africa, political instability and severe poverty result in large population movements across national borders. Large refugee camps with no or

poor sanitation and health services have been constructed in Western and Central Africa because of tribal wars. The very real threat of reappearance of poliomyelitis in polio free countries as a result of reintroduction from polio endemic areas exists in many African countries.

During January 1997 to June 1998, NIDs were held for the first time in the Gambia, Guinea, Guinea Bissau, Mali, Niger and Senegal, and all countries but two (Sierra Leone and Liberia) in the western region have administrated supplementary OPV doses. Vaccination coverage in these countries was reported at >80%. But as of September 1998, surveillance of acute flaccid paralysis had not been established in the Gambia, Liberia, Mauritania and Sierra Leone for West Africa, and Somalia and Ethiopia for East Africa. Many persistent obstacles exist in great lake region of central Africa, in Algeria and Angola to continue NIDs (Anonymous, 1998a). Polio eradication remains a challenge in Africa for a number of specific reasons.

Indeed, regions of central Africa are in a great political instability since the beginning of the 90s, and all efforts undertaken as regards eliminating poliomyelitis are to be redefined. In Angola, civil war resumption has led to the reappearance of new epidemic sources. Important movements of populations have led to a drop of vaccination coverage in this region. Civil war areas are also met in West Africa (in Liberia and Sierra Leone) where many years of war have seriously destroyed sanitary infrastructures and health ministries which do not have sufficient human or financial resources anymore. Such is also the case of Chad with it particular position in Africa at the crossroads of the endemic regions of western and central Africa. In Sudan at the crossroads of northern and southern regions, there is no government since nine years

Improving poliomyelitis surveillance is feasible in Africa; that has proved that Chad undergoes one of the highest endemicity rates of the world with almost 40% of PFA cases having positive tests for wild PV (Anonymous, 2000b) . Poliomyelitis eradication is also envisageable seeing that South Africa remains a polio- free zone since many years. However, we must focus our efforts on regions that have not yet settled following NIDs programs, flooding them with oral polio vaccine, but also sustaining current programs for contribution of supplemental doses and investigation of all suspicious cases.

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