Review

Oral polio vaccine immunization coverage with regard to polio eradication in Zambia: 2000-2009: A review

*1Rufaro Murebwa Chirambo, 2Professor Kumar Sridutt Baboo and 3Professor Seter Siziya

PHD Student, University of Zambia, School of Medicine, Department of Public Health, Lusaka, Zambia.
National Professional Officer – EPI Surveillance @ World Health Organization, Zambia.

Accepted 06 October, 2014

During the 41st World Health Assembly (WHA) meeting, it was resolved that World Health Organization (WHO) takes initiative for global eradication of poliomyelitis exclusively by Oral Polio Vaccination (OPV) by year 2000 with all member countries. WHO Expanded Program on Immunization (EPI) schedule requires all children below 1 year of age to get 4 doses of OPV. A regular review of OPV3 coverage is essential to ensure high immunization coverage is sustained to prevent an outbreak in the event of Wild Polio Virus (WPV) importation or resurgence of poliomyelitis. A review of monthly OPV 3 routine immunization data from districts for children aged < 1 year and children aged < 5 years who had received OPV during Supplemental immunization activities done. Immunization performance was evaluated using the WHO-specified targets of 80% and 90% at district and national levels respectively. Although routine immunization coverage’s were high at national level with a mean of 92%, only fifteen out of twenty-five (61%) districts attained the target during 2000-2009. The range was 81% to 101%, 22% to 89% and 36% to 76% at national, provincial and district levels respectively. The target for supplemental immunizations was attained in fourteen out of sixteen rounds conducted.

Key words: World Health Assembly, eradication, importation, resurgence, poliomyelitis, immunization coverage, supplemental immunizations, routine immunizations, oral polio vaccines, wild polio virus.

INTRODUCTION

In 1988, the World Health Assembly (WHA) passed resolution 28 known as WHA 41.28, declaring that "World Health Organization (WHO) takes initiative for global eradication of poliomyelitis exclusively by Oral Polio Vaccine (OPV) by year 2000, with all member countries during the 41st meeting, a goal that was later pushed to 2005, 2010, 2012 and then to 2018. Since then, Polio cases worldwide have decreased by over 99%. In the African Region, Nigeria presents the biggest challenge to polio eradication and is among the three countries that remain polio endemic globally (Global Polio Eradication, 1988; Ong and Fisher, 2005; CDC, 2010). Others are Pakistan and Afghanistan.

Ensuring a consistently high level (90% and above) of routine immunization coverage with trivalent Oral Polio Vaccine (tOPV) among children under one year of age, (at birth, 6, 10 and 14 weeks) including those in the most inaccessible places is the cornerstone of the polio eradication strategy. It is also referred to as the "bedrock" for polio eradication (Ong BK and Fisher DA, 2005). Ong and Fisher (2005) state that high immunization coverage with OPV reduces the incidence of polio and makes eradication feasible. Unless high immunization coverage is maintained, pockets of non-immunised children build up creating conditions conducive to the spread of polioviruses (Ong BK and Fisher DA, 2005). There are two polio vaccine types; 1. Inactivated Polio Vaccine (IPV) which is the Salk vaccine, was licensed in 1955 and is given by injection. 2. The live attenuated OPV (Sabin vaccine) which was licensed as monovalent OPV in 1961 and as trivalent in 1963 (CDC, 2014). Although OPV became the vaccination of choice after being introduced, an enhanced-potency version of the inactive vaccine was introduced in 1998 and has been preferred ever since. This is because OPV can cause a rare but serious reaction called Vaccine-Associated Paralytic Poliomyelitis (VAPP) (CDC, 2014). Most adults do not need polio vaccination because
vaccination because they were vaccinated as children but in general, three groups of adults are at high risk of coming into contact with the poliovirus and should consider polio vaccination: 1. People traveling to areas of the world where polio is endemic 2. Laboratory workers who might handle polioviruses 3. Healthcare workers treating patients who could have polio. Adults in these three groups, as well as those who have never received the polio vaccination should get three doses; first dose at any time, second dose 1 to 2 months later and third dose 6 to 12 months after the second dose (CDC, 2014).

With the development and evaluation of bivalent oral polio vaccine in 2009, the Global Polio Eradication Initiative now has an armory of five different vaccines to stop polio transmission; OPV, monovalent Oral Polio Vaccines (mOPV1 and mOPV3), bivalent Oral Polio Vaccine (bOPV) and IPV (WHO, 2010). In most countries which introduced polio vaccination in early years, OPV replaced IPV because of its ease of administration, suitability for mass vaccination campaigns, superior induction of intestinal mucosal immunity, and lower production costs. In regions without wild poliovirus, IPV is the vaccine of choice (American Academy of Pediatrics Committee on Infectious Diseases, 1997). In regions with higher incidence of polio and thus a different relative risk between efficacy and reversion of the vaccine to a virulent form, live vaccine is still used(Salisbury D, Ramsay M, Noakes K, 2006). The supplementary immunization with monovalent strains of OPV type 1 or type 3 or with a new bivalent oral polio vaccine bOPV (containing type 1 and type 3 PV) has been introduced in those regions where the virus has been difficult to control(Salisbury D, Ramsay M, Noakes K, 2006; CDC, 2009). A person is considered to be fully immunized if he or she has received a primary series of at least three doses of IPV, OPV or four doses of any combination of IPV and OPV. One dose of OPV produces immunity against all three polio virus serotypes in approximately 50% of recipients; three doses produce immunity in more than 95% of recipients (Verma R, Khanna P, Chawla S, 2012).

Both IPV and OPV give immunity to polio, but as with other live-virus vaccines, immunity from OPV is probably life-long and induces both humoral and gut / intestinal immunity. The intestines are the primary site of wild poliovirus entry, so intestinal immunity helps prevent infection with wild virus in areas where the virus is endemic (WHO, April 2012). Additionally, the live virus used in the vaccine is shed in the stool and can be spread to others passively within a community, thus preventing the disease from spreading to other people (Verma R, Khanna P, Chawla S, 2012; WHO, March 2014). IPV appears to produce less local gastrointestinal immunity than does OPV and its duration of immunity is not known with certainty, although it probably provides protection for many years after a complete series. So, persons who receive IPV are more readily infected with Wild Polio Virus (WPV) than OPV recipients (Verma R, Khanna P, Chawla S, 2012; WHO, April 2014).

A major concern about OPV vaccination however, is its known ability to revert to a form that can achieve neurological infection and cause VAPP cases and the emergence of Vaccine Derived Poliovirus (VDPV) strains, having more than 1% nucleotide divergence from the original vaccine strains in the Viral Protease 1 (VP1) coding region of the genome (Baicus A, 2012). The VDPV strains could be circulant (cVDPV); which can spread in populations with low level of routine OPV immunization coverage and could cause outbreaks of paralytic polio. Vaccine Derived Polio Virus strains can also emerge after replication in immune-deficient persons exposed to OPV (iVDPV) or be ambiguous (aVDPV); when they are isolated from immune-competent persons or the environmental source has not been identified (Baicus A, 2012).

Reversion is believed to occur in almost all vaccine recipients, but it rarely results in paralytic disease. Most VDPVs disappear over time without causing any clinical disease (Kew O, Morris G, Landerverde M, Burns C, Shaw J, Garib Z, et al, 2002). Cono and Alexander (2002) stated that the Clinical disease, including paralysis caused by VDPV is indistinguishable from that caused by WPVs and may be permanent. Polio vaccination can protect people against naturally occurring polioviruses and VDPVs. Davis and Wright (2012) and CDC (2012) referred to this as the OPV paradox, stating that cVDPV is produced by vaccination and prevented by vaccination. The paradox does not apply in areas where OPV coverage is high enough to prevent cVDPV introduction. Davis and Wright (2012) stated that the OPV risks do not apply in countries which have used IPV as their long-standing defense against polio or to the increasing number of countries which after achieving high OPV coverage have switched to IPV.

One case of VAPP occurs for every 2 to 3 million doses of OPV administered. Over the past decade, more than ten billion doses of oral polio vaccine have been given worldwide, with only six outbreaks of cVDPV confirmed, resulting in approximately 50 cases of paralytic polio (Baicus A, 2012). The rate of VAPP varies by region but is estimated to be 1 case per 750,000 for immune-competent children receiving their first dose of OPV and one case per 6.9 million for subsequent doses (Prevots DR, Sutter RW, Strebel PM, Weibel RE, Cochi SL, 1994). Cono and Alexander (2002) stated that VAPP is more likely to occur in adults than in children and is much more likely to occur in immunodeficient children than in those who are immunologically normal.

According to WHO (2008), outbreaks of vaccine derived polio have been stopped by multiple rounds of high-quality vaccination, achieved by endeavoring to
immunize the entire population. Virologists however say that the world is at risk of VDPV causing polio in unprotected children as long as OPV is used. Nonetheless, OPV continues to be used in the countries where polio is not only endemic but where the risk of importation and transmission is high (Cono J, Alexander LN, 2002; WHO, 2008). The World Health Organization considers the benefits of vaccination to far outweigh the risk of Vaccine Derived Polio, which occurs in one child out of every 2.4 million OPV doses distributed (Baicus A, 2012).

Nevertheless, as the incidence of wild polio continues to diminish, nations will transit from using OPV back to IPV because the direct risk of iatrogenic polio (VAPP) due to OPV outweighs the indirect benefit of immunization via subclinical transmission of OPV. World Health Organization (March 2014) states that achieving a polio-free world will require the "cessation of all OPV" and with it the elimination of the risk of VAPP or VDPV infections. According to the endgame plan to achieve and sustain a polio-free world, the use of OPV must eventually be stopped worldwide, starting with OPV that contains type 2 polioviruses, which is tOPV, in preference to bOPV. This is because no WPV type 2 has been recorded since 1999 and the risk of paralytic polio disease due to the type 2 component of OPV now outweighs its benefits. In addition, at least one dose of IPV must be introduced as a risk mitigation measure (WHO, March 2014; April 2014).

WHO (March, 2014) states that IPV introduction will set the stage for ending OPV use entirely in 2019-2020. High immunization coverage with IPV is the best strategy for reducing the risk of cVDPV emergence before, during and after the withdrawal of OPV.

It will also boost population immunity against polio and mitigate paralysis risks in the case of outbreaks by ‘priming’ the population against type 2 poliovirus and ensuring better immune responses to OPV if needed. Strengthening routine immunization is necessary to achieve and maintain high population immunity against polioviruses, especially type 2, after OPV type 2 is withdrawn. The magnitude, number and length of both WPV and cVDPV outbreaks are closely correlated with weaknesses in routine immunization systems (WHO, March 2014). When IPV is administered after a few doses of OPV, the IPV not only enhances protection against paralytic disease but also boosts intestinal immunity, even more than an additional dose of OPV would provide. Thus, combining IPV with bOPV provides the advantages of both vaccines against the two serotypes in bOPV, types 1 and 3. This combination gives both the child and the child’s community the best protection (WHO, March 2014).

The most important step in the eradication of polio is interruption of endemic transmission of poliovirus which can be pursued through a combination of four WHO recommended strategies (Global Polio Eradication Initiative, 1988; Andrus JK, de-Quadros C, Olive JM, Hull HF, 1992). According to WHO (2010) ample evidence demonstrates the effectiveness of OPV in controlling poliomyelitis and eliminating the circulation of polioviruses. The evidence includes the sharp decline in poliomyelitis cases following introduction of polio vaccines in both industrialized and developing countries. As long as WPV transmission has not been interrupted everywhere, all polio-free countries and areas remain at risk of re-importation, particularly from countries where polio remains endemic (Fine PE, Carneiro I 1999). From 2003 to 2009, WHO recorded 133 WPV importation events in 29 previously polio-free countries (Dutta A, 2008). The risk of importation with subsequent spread was highest in countries immediately bordering endemic countries, and was also higher in countries with low routine OPV 3 immunization coverage (WHO, 2010). WHO (2010) therefore recommends that all children worldwide be immunized against poliomyelitis, and every country should seek to achieve and maintain high levels of coverage with the polio vaccine.

The WHO had established a global target of at least 90% immunization coverage with all vaccines used in EPI, including OPV at national level and 80% in every district by the year 2000. At district level, 80% of districts should achieve 80% immunization coverage. (Global Polio Eradication Initiative, 1988; Bermier R, Orenstein W, Hutchins S, Zell E, Cutts FT, Smith PG, 1994). According to CDC (1996), the global immunization coverage for polio was over 80%, but coverage in some countries especially those affected by war was much lower by 1995. Fewer than 25% of children were immunized in Afghanistan and less than 20% in Chad. Oblapenko and Sutter (1997) further reported that in Chechnya and the Russian Federation, conflict led to halting immunization for three years and in 1995 there was an outbreak with more than 150 cases of poliomyelitis reported.

Elsewhere, even slight reductions in immunization coverage, for example in Albania (WHO, 1992), Azerbaijan (Cochi SL, Hull HF, Ward NA, 1995) and Bulgaria (WHO, 1992) led to epidemics of poliomyelitis. By 1997, 82% children were fully immunized - a 22% increase over 1988, when the poliomyelitis eradication initiative was launched (WHO, 2005).

Immunization services have been conducted in Zambia since the inception of the EPI programme in 1975, running as a vertical programme in health facilities and have been implementing the Universal Childhood Immunization (UCI) programme, managed by UCI Secretariat since 1984 (Ministry of Health Zambia, 2009). Since then, high vaccine coverages have been achieved through fixed and outreach posts, resulting in the reduction of reported cases and deaths due to vaccine preventable diseases. To achieve and maintain high levels of vaccination coverage in Zambia, routine vacci-
nations were supplemented by annual National Immunization Days (NIDs) from 1996 to 1998 and Sub-NIDs conducted in districts bordering DR Congo and Angola from 1999 to 2001 (Ministry of Health Zambia, 2009).

Additionally, mop-up immunizations were conducted in 2002 in Western and North-western provinces following importation of WPVs from Angola into Kalabo district of Western province (Ministry of Health Zambia, 2009). Thereafter, Child Health Weeks have been conducted twice per year. Although routine immunization is institutionalized and functional, it is challenged by a combination of factors; inadequate supervision, monitoring, transportation, logistic support and detailed micro-planning. (Ministry of Health Zambia, 2009). The country has been polio free since 2002. The last indigenous WPVs were detected in 1995.

According to Fine (1993) and CDC (2013), herd immunity can only be achieved when vaccination levels are high and maintained to stop transmission and prevent outbreaks occurring. It is estimated that 80-86 percent of individuals in a population must be immune to poliomyelitis for the susceptible individuals to be protected by herd immunity (Fine P, 1993; CDC, 2013). Aylward (2006) and Schonberger L et al (Kaplan J, Kim-Farley R, Moore M, Eddins D, Hatch M, 1984) have stated that the two vaccines, OPV and IPV have eradicated polio from most countries in the world and reduced the worldwide incidence from an estimated 350,000 cases in 1988 to just 223 cases in 2012 (CDC, 2013; WHO, 2013).

If high immunization coverage is not constantly achieved and maintained, pockets of non-immunized children build up, favoring continued spread and outbreaks of poliovirus in the event of an importation from endemic countries, or when re-introduced from other countries through international travelers, migrant populations from conflict areas or population sub-groups who refuse routine immunizations (Global Polio Eradication Initiative, 1988; CDC, 2004; Ong BK and Fisher DA, 2005). Ottesen E et al (Dowdle WR, Fenner F, Habermehl KO, John TJ, Hoplins D, 1998) stated that, while routine immunization alone cannot eradicate the disease, good routine oral polio vaccine coverage increases population immunity, reduces the incidence of polio and makes eradication feasible.

The presence of susceptible subgroups with gaps in immunization favors the introduction of wild polio virus strains in a vaccinated population. There is a close relationship between routine OPV3 coverage and risk of single versus multi-case outbreak. When the coverage is 80% and above, there is risk of a single case outbreak as compared to when the coverage is less than 80% when there is a risk of multi-case outbreak due to accumulation of susceptibles (Dutta A, 2008). This would lead to re-established polio infection and compromise the polio free status attained in 2005. Furthermore, the goal of global polio eradication would be delayed.

High levels of vaccination coverage with OPV are therefore required through intensive micro-planning, consistent and regular supportive supervision, monitoring, adequate transportation and logistic support, including vaccine supply to ensure herd immunity is maintained. In addition outreach vaccinations should be well planned and implemented, as well as ensuring community involvement. Population immunity is a defence against imported polio viruses. The OPV 3 immunization coverage in Zambia has been fluctuating over time, especially at sub-national levels (Ministry of Health Zambia, 2009). The objective of the study was to review the routine immunization coverage for OPV 3 and supplemental immunization coverage between 2000 to 2009, with the view of identifying opportunities for system strengthening and enhance OPV 3 coverage.

**METHODS**

**Study setting and design**

Zambia is a landlocked country covering an area of 752,612 square kilometers (about 2.5% of Africa). It shares borders with eight neighboring countries, Democratic Republic of Congo (DRC) and Tanzania in the north, Malawi and Mozambique in the east; Zimbabwe and Botswana in the south; Namibia in the southeast and Angola in the west. The country is divided into nine provinces, with an estimated population of 13,046,508 million (2010 census), of whom 6,394,455 (49%) are male and 6,652,053 (51%) are female; 7,978,274 (61%) resided in rural areas and 5,068,234 (39%) in the urban areas. Forty eight percent (6.2 million) of the total population is aged less than 15 years, under 5 years constitutes 20% and 4% is under 1 year.

Records of routine immunization data submitted monthly from all districts were reviewed in the WHO immunization data base, with a focus on number of children aged below 1 year who were vaccinated with 3 doses of OPV. Records of supplemental immunization coverage were also reviewed, focusing on the number of children aged below 5 years who were vaccinated with OPV during NIDs and sNIDs. Analysis was then done on the secondary immunization data for the period 2000-2009 by working out percentage Coverages for routine and supplemental immunizations as follows:

Routine immunizations

\[ \text{Routine imm.} = \frac{\text{Number of children vaccinated in target age group}}{\text{Target population (4% of total population)}} \times 100 \]

Supplemental imm.

\[ \text{Supplemental imm.} = \frac{\text{Number of children vaccinated in target age group}}{\text{Target population (20% of total population)}} \times 100 \]
Immunization performance was evaluated using the WHO-specified target of 90% at national and 80% at district levels for routine immunizations and 90% for supplemental immunizations. Means were worked out per year to determine the average number of districts that attained or did not attain the target accordingly.

**RESULTS**

Reported OPV3 coverage has been fluctuating overtime. The 90% target was not attained at national level in 2000, 2002 and 2007 as shown in figure 1. The mean immunization coverage's in the period under review were 92% at national and 62% at provincial levels. At provin-
Figure 3. Proportion of districts that attained / did not attain 80% OPV 3 coverage by year.

Figure 3. Shows the proportion of districts that achieved / did not achieve the 80% OPV 3 target in the period under review.

Figure 4. Shows NIDs and sNIDs immunization coverage’s in the period under review.

Chirambo et al. 037

Figure 3. Proportion of districts that attained / did not attain 80% OPV 3 coverage by year.

Figure 3. Shows the proportion of districts that achieved / did not achieve the 80% OPV 3 target in the period under review.

Target: 90%

Provincial level, 62% (6/9) achieved the target and 38% (4/9) could not, as shown in figure 2. At district level, 61% (15/25) of districts achieved the 80% target, 39% (10/25) could not, as indicated in figure 3. The range was 81% to 101%, 22% to 89% and 36% to 76% at national, provincial and district levels respectively. Out of the nine provinces, only Central province attained the 90% target throughout the period under review. In 2004 and 2008, all provinces apart from Copperbelt attained the target. In 2002 and 2009, 50% of provinces could not attain the OPV
DISCUSSION

Although immunization coverage figures were high at national level, with figures being higher than 90% in a number of years, there was suboptimal performance at district level with most districts failing to achieve the 80% target for OPV 3 immunization. Factors affecting the coverage could be attributed to inadequate implementation and monitoring of a financial sustainability plan for immunizations at all levels, insufficient political and social commitment to routine immunizations, inadequate health system and community partnership in tracking eligible children, regular vaccine stock outs and lack of active efforts, e.g. training, supervision of health workers to improve interpersonal communication at vaccination sessions. Other factors could be; immunization services not being tailored to community needs, not using service, performance and outcome data to improve services, insufficient monitoring of outreach sessions, vaccine availability, and drop-out rate including those related to fear of adverse effects following immunization (AEFIs), and ensuring its 10% at all levels. Others are Lack of community awareness leading to less demand for routine immunizations and inadequate micro-planning. Addressing these gaps could lead to a lift in the OPV 3 coverage. Although national aggregate immunization coverage’s were high, there is need to closely monitor performance at district level to ensure underperforming districts are identified and remedial measures taken. National aggregate figures tend to mask the underperforming districts.

The findings of this study coincide with the global OPV3 coverage which indicated that most WHO regions could not attain the 90% target in the period under review.

Global routine vaccination coverage for infants with 3 doses of OPV was estimated at 78% in 2005, the most recent year with fully reported data, and was similar to the 3-dose OPV coverage reported in 2004 (81%). Estimated routine coverage varied among WHO regions in 2005: 63% in the South-East Asian, 69% in the African, 84% in the Eastern Mediterranean, 87% in the Western Pacific, and >90% in the European and Americas. In the four polio-endemic countries, 3-dose OPV coverage was estimated at 77% in Pakistan, 76% in Afghanistan, 58% in India, and 39% in Nigeria; however, lower coverage has been reported in areas with ongoing polio transmission e.g., northern Nigeria and the northern Indian states of Uttar Pradesh and Bihar (Global Polio Eradication Initiative, 1988).

An estimated 83% of infants worldwide received at least 3 doses of DTP vaccine in 2011, similar to coverage in 2009 (83%) and 2010 (84%). Among 194 WHO member states, 130 (67%) achieved ≥90% national DTP3 coverage.

However, 22.4 million children were incompletely vaccinated at 12 months of age and remained at risk for vaccine-preventable morbidity and mortality. More than half of all incompletely vaccinated children live in 3 countries: India (32%), Nigeria (14%), and Indonesia (7%).

During 2001, coverage with 3 doses of oral poliovirus vaccine (OPV) was estimated at >90% in two countries (Mauritius and Seychelles), at 80–89% in four countries (Botswana, Lesotho, Malawi, and South Africa), and at 70–79% in five countries (Comoros, Mozambique, Swaziland, Zambia, and Zimbabwe). Coverage was lowest (<70%) in three countries: Namibia (64%), Madagascar (58%), and Angola (44%) (Jawetz E, Melnick JL, Aldelberg EA, 1982). To the contrary, WHO / UNICEF (2010) estimates indicate that 86% of infants received three doses of oral polio vaccine in 2010, compared with 75% in 1990. Despite improvements in global vaccine coverage during the past decade, there continues to be regional and local disparities resulting from limited resources, competing health priorities, poor management of health systems and inadequate monitoring and supervision.
Strengthening routine immunization services, especially in countries with the greatest number of under-vaccinated children, should be a global priority to help achieve the fourth Millennium Development Goal, to reduce mortality among children <5 years of age by two-thirds from 1990 to 2015 (WHO, 2012). High routine immunization coverage is a critical factor in reducing the risk of outbreaks following importation of WPV. All identified countries with persistent high risk of importation ought to review or develop plans for strengthening Immunization coverage (Ong BK and Fisher DA, 2005). The drivers of RI performance improvement need to be identified, explored and strengthened at every level to enhance population immunity through strong immunization partner coordination, advocacy and continued political and social commitment. An assessment should also be done to document reasons for sub-optimal routine immunization performance in districts with the highest number of un-immunized children or those that could not attain the 90% target and findings used to inform routine immunization improvement plans (Ong BK and Fisher DA, 2005).

The factors associated with under-vaccination may be different from those associated with non-vaccination (WHO, 2005). For example, immunization system’s issues are more commonly reported with under-vaccination while access to services, parental attitudes, knowledge and practices appear to play a greater role among children who have not received any vaccination. For improvements in global vaccination coverage to occur, multifaceted and tailored strategies will be required by countries to address the factors contributing to incomplete infant vaccination, particularly among countries with the largest number of unvaccinated children (WHO, 2005). There should also be a strong health system - community partnership and a regular review of program and health worker performance including training, depending on the identified gaps. Involvement of cooperating partners in form of funding, technical advice, capacity building and provision of equipment and commodities is another factor that could enhance the OPV 3 coverage, including regular supply and monitoring of vaccine utilization and adequate cold chain. This could result in building community confidence in immunization services and enhance community acceptance and demand for services.

The 90% target for Supplemental Immunization Activities (SIAs) for OPV was reached during all rounds, apart from the first two (2) rounds in1996. The success could be attributed to political commitment for the programme in the country, hard work of the volunteers and supervisors and effective social mobilization. The support from the various NGOs, good organization and coordination, availability of logistics could be other contributory factors. To the contrary, a global outlook of SIAs showed that there were low coverages for OPV in countries that conducted SIAs using mOPV1 (monovalent OPV) in 2005 and 2006 with coverages of 22% and 46% respectively, reflecting programmatic shift in campaign strategy. The SIAs were conducted in endemic countries, where WPVs were re-introduced through importations in 2006 and in countries with no WPV confirmed cases in 2006 as a precaution against polio virus importation (WHO, 1998). The OPV 3 coverage was not consistently above the recommended target, this need to be addressed to avoid continued spread and outbreaks of poliovirus in the event of an importation from endemic countries.

CONCLUSION

Routine immunization for the oral polio vaccine has been an integral part of immunization activities in Zambia. Although the national immunization coverage figures were high, the WHO target was not achieved in most districts and provinces in the period under review. This situation needs to be addressed through partner collaboration, ensuring adequate micro-planning, vaccine and logistics supply, as well as community involvement to raise and sustain herd immunity in case of imported polio viruses. While routine immunizations alone cannot eradicate the disease, good routine OPV coverage reduces the incidence of polio and makes eradication feasible. It also prevents the re-establishment of poliovirus if it is re-introduced from other countries, through international travelers and migrant populations from conflict areas, importations or population sub-groups who refuse immunization. Polio-free countries must therefore continue to ensure high levels of immunization coverage with OPV 3.

A person is considered to be fully immunized if he or she has received a primary series of at least three doses of IPV, OPV or four doses of any combination of IPV and OPV. One dose of OPV produces immunity against all three polio virus serotypes in approximately 50% of recipients; three doses produce immunity in more than 95% of recipients. With the development and evaluation of bivalent oral polio vaccine, the Global Polio Eradication Initiative now has an armory of five different vaccines to stop polio transmission; OPV, monovalent Oral Polio Vaccines (mOPV1 and mOPV3), bivalent Oral Polio Vaccine (bOPV) and IPV.

ACKNOWLEDGEMENTS

Many thanks go to the communities for taking the eligible children to health facilities for immunizations, without which immunization coverage figures would not have been available. Many thanks also go to health workers in all health facilities that vaccinated children in the less than
year and 5 years target groups in the 2000 to 2009 period, information officers at all levels that availed immunization coverage’s figures on a monthly basis, for their cooperation and support to make the evaluation of secondary data a reality. Thanks also go to the information officers at the Ministry of Health and WHO for updating and maintaining the routine immunization data bases from which data could be sourced.

REFERENCES


CDC (2013). Our progress against polio; www.cdc.gov/polio/progess

CDC (2014). Interim CDC Guidance for Polio vaccination for travel to and from countries affected by wild polio virus. MMWR Morb Mortal Wkly Rep; 63 (27); 591-594


WHO (2007). Europe achieves historic milestone as region is declared polio-free. Press release, European Region of the World Health Organization.

WHO (2008). What is vaccine-derived polio?


WHO (2012). Global routine vaccination coverage Wkly Epidemiological Record.


