

**Afghanistan Polio Eradication Initiative**  
**Epidemiological Investigation Report NSL 1, AFG/06/09/040**  
**District Barg-e-matal, Nuristan province, Eastern Region**

A detailed epidemiological investigation was carried out in response to the isolation of wild polio virus type 1 from a 24 months old child from village Saeed Abad, district Burgimatal, Nuristan Province in an attempt to identify the possible source of infection in that remote and thinly populated area with difficult access, weather conditions and adverse security situations. The report also addresses the situation with regards to the immunity level in preventing the circulation and establishment of the virus in the area / region and also recommend and implement appropriate preventive measures.

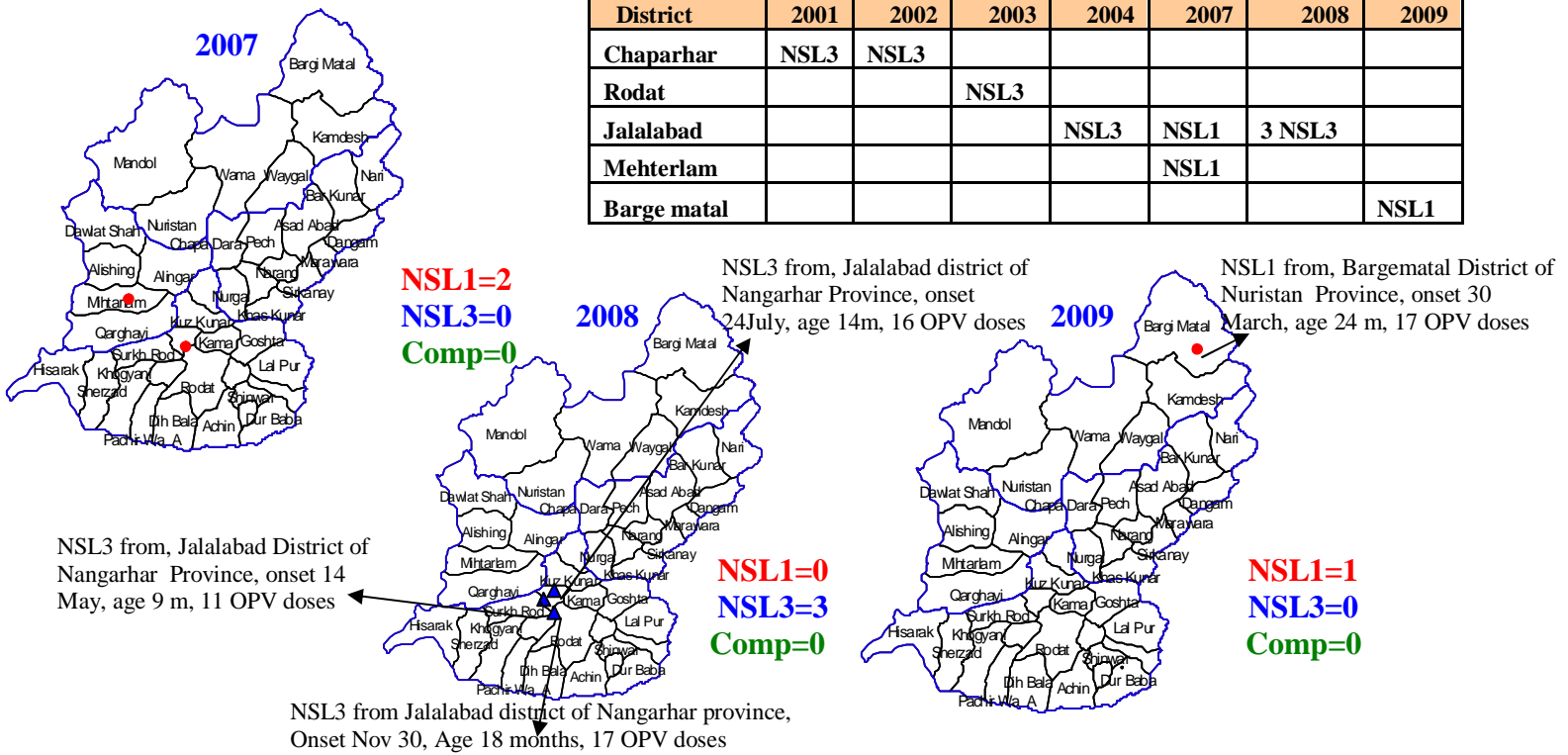
**Background:** In 2008, three cases of NSL3 were identified, one each from Behsud, Naranjbagh and Joe 11 area of Jalalabad city during the months of May, June and November respectively (Figure 1).

From 2001 to 2004 one case of NSL3, has been isolated, each year, from the province of Nangarhar, in the Eastern Region, with close lineage to the corresponding isolates in NWFP, Pakistan. NSL1 was isolated from 2 healthy children from district Momandara (2005) and from a paralyzed child from district Rodat (2006) of Nangarhar province. In 2007, two NSL1 were isolated, one each from Mehterlam (Laghman) and Jalalabad (Nangarhar). Again the genetic sequencing linked these cases with ones from 2005 and 2006 in NWFP (Pakistan).

**Figure 1:**

**Polio confirmed cases 2001 – 2008, Eastern region**

District	2001	2002	2003	2004	2007	2008	2009
Chaparhar	NSL3	NSL3					
Rodat			NSL3				
Jalalabad				NSL3	NSL1	3 NSL3	
Mehterlam					NSL1		
Barge matal							NSL1

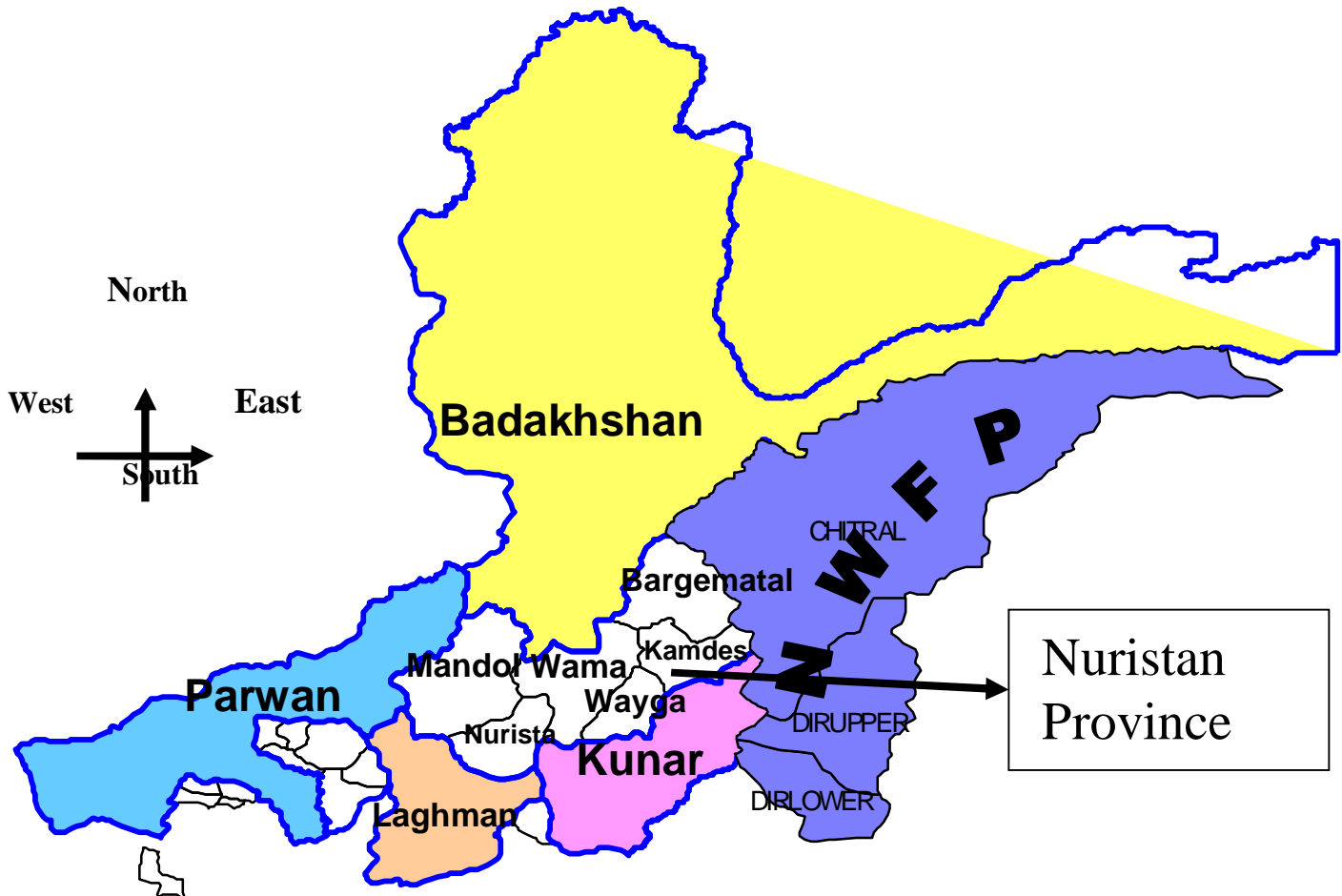


**Demographic details:**

Name: Ibtisama  
Father's Name: Sayed Ahmad  
Age: 24 months.  
Sex: Female  
Date of onset of paralysis: March 30, 2009  
Date reported: April 6, 2009  
Provisional diagnosis: Viral Neuropathy – (Left leg weakness)  
Address: Saheedabad village – District Bargematal, Province Nuristan

**General description of the area**

Nuristan is remote geographically difficult province of the Eastern region, borders with Chitral (Pakistan) on its North east, Badakhshan towards Northwest, district Parwan to its west and Kunar province towards its south. Terrain is highly mountainous and roads are either absent or too dangerous to travel. Winters are severe with snow all over, which makes most of the province largely cut off from other areas of the Eastern region. Security situation further complicates the situation, as except Paroon (the provincial Headquarter) all of the other districts are effectively under the control of AGEs. The province has six districts, with a total population of 197,994 (target population of 39,599) and thinly spread in an area of approximately 10,000 square kilometers. The local population makes seasonal local movements to higher elevations during summers and settles in lower grounds during winters.



District Bargematal has a total population of 21,991 (target population 4,398). It borders with districts Kamdesh of Nuristan and Chitral of NWFP (Pakistan) on the East, district Wama to the South and Badakhshan province in the North. Geographical approach to the district is from Kunar province through Kamdesh and Wama districts of Nuristan. There is no direct access to Chitral (Pakistan) and Badakhshan from here. For NIDs purpose the district is divided in 6 clusters (A – F). The family of the current NSL1 case lives in Saeedabad village which is located near the centre of Bargematal. This village is in cluster A, as per the NIDs micro-planning. Total population of this cluster is 8,595 (target 1,719).

**Accessibility and status of Health services delivery:** Nuristan is a ‘No Go’ area for the UN. Only rarely, a Joint UN helicopter mission to Paroon, is made for participation in Provincial Developmental Committee Meetings. Government authority is only limited to the district centers and all the remaining area is effectively under the control of the AGE. The access to the eastern and central Nuristan is through Kunar while the western Nuristan is accessed from Laghman province of the Eastern region. The delivery of health services is through BPHS NGO International Medical Corps (IMC), however lack of supervision makes it difficult to have a first hand knowledge of the efficacy of health services. The Provincial Health director and the PEMT staff mostly operate from Kabul or Kunar and make once a month trip to the province.

#### **General cleanliness and hygienic conditions of the index house and surroundings:**

The family is currently living in its winter location in Saeedabad village in a single compound. The village with around 300 houses is very congested and thickly populated. The family rear cattle and migrate to higher altitudes during summers, as like the other people of the village. The socio economic conditions of the local population are very poor. Source of drinking water is from river and open springs. Disposal of human excreta and other wastes is highly inappropriate. Streets drains are open and overflowing and garbage and human excreta is littered around. Understanding of the family regarding personal hygiene, sanitation and importance of immunization is very low.

**Clinical History:** The parents of the affected child were thoroughly interviewed. According to the details, *On March 28, 2009* the parents observed that the child was irritable and was suffering from fever and diarrhea. No treatment was done as the parents thought that the baby would be fine with in a day or two. However, on **March 30, 2009** the child developed left leg weakness. She was then taken to the private clinic of Dr. Ghulam Farook. The doctor examined the child and gave some antipyretics and antibiotics. The parents treated the baby with the same medicines for four days, but there was no improvement in the condition of the baby. *On April 6, 2009* the local vaccinator Abdul Wali, identified the case as an AFP. He accompanied the child and her parents to Assadabad, Kunar and child was admitted in Asadabad Provincial Hospital. Dr Mohammad Sardar, WHO PPO Kunar was informed and the case was notified as an AFP and investigations initiated. The case was not labeled as HOT as no floppy paralysis was observed. There is no history of giving injections to the child.

The child was brought to Jalalabad and again examined on April 18, 2009. On clinical examination the left leg had low power and hypotonic. The child though could move and raise the left leg but walking was difficult. Some degree of wasting of the left leg was also noticed. Tendon reflexes were diminished and Babinski sign negative. Sensations were intact. The child though, unable to stand without support, the parents had observed major improvement.

**Family History:** The father of the child is teacher in Awlagul village Madrassa (Religious school). He has two wives with 9 children in all, 5 girls and 4 boys. Only the family of the index case lives alone in the compound.

Father's Name		Names of Children	Sex	Age months	OPV doses		
					Routine	SIAs	Total
Saeed Ahmad	First wife	Ibtisama	Female	24	3	14	17
		Sadat	Male	60	1	30	31
		Ihtesam	Male	84	BCG	30	30
		Motadela	Female	132	According to the mother of the child she received OPV several times during the SIAs however did not remember the exact number of doses.		
		Adela	Female	168	No vaccination history available		
		Shamshad Ahmad	Male	216	No vaccination history available		
	Second wife	Basom	Female	84	BCG	30	30
		Siadat	Male	48	0	25	25
		Semara	Female	12	0	7	7

*Note: The history of vaccination is largely through parent's recall, except the routine immunization of the index case, where record is available.*

**History of Travel:** History of travel was meticulously investigated. The index child or the family has not traveled outside the district since long. Father of the index case teaches at a Madrassah. The students are also from the same district. The only travel the family undertakes is the seasonal movement. No member of the extended family or close neighbours has a history of travel. One of the neighbour, a lady travels often to Chitral Pakistan for her medical treatment.

There is no history of any one visiting the family or the neighborhood, before or after the onset of paralysis. However, a cousin of the index child, Noor Ahmad visited the family around two months before the onset of paralysis from Peshawar. Noor Ahmad is a student in a Madrassah in Peshawar and resides there. After staying for two weeks with the family, he went back to Peshawar. Furthermore, there is no evidence of any migration or recently arrived returnees in the area, especially from the Bajaur area, where an NSL1 case has been recently isolated.

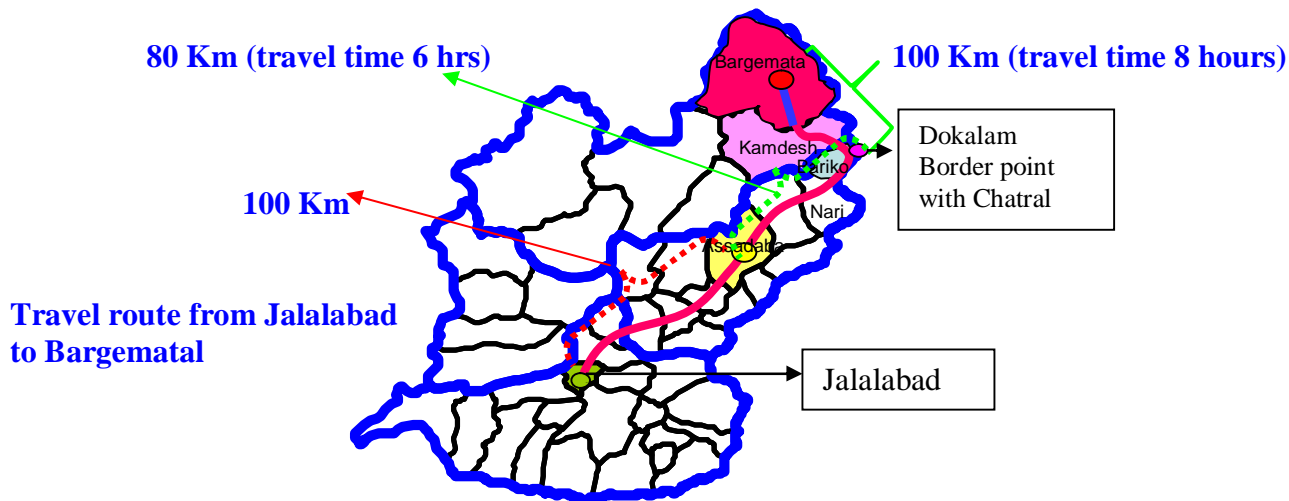
**Vaccination History:** The index child had received 3 Routine OPV doses as evident from the vaccination register maintained at the local health facility (attached). The vaccination card was lost by the family. The child has received OPV Zero dose with BCG and OPV 1 and 2 with DTP 1 and 2 respectively. No other routine vaccination has been given. After thorough discussion and investigations, including examining records at the Bargematal district center Clinic, the family did not return for further routine immunizations. The area is covered by the out reach vaccination program. 14 OPV doses were given during all the SIAs, as corresponding to the age of the child. The child had thus received a total number of 17 OPV doses, including Routine and SIAs. OPV was given as per following schedule, as also evident from the EPI register.

	Vaccination	Date
1	BCG	April 4, 2007
2	OPV 0	April 4, 2007
3	OPV1	June 20, 2007
4	OPV2	Aug 27, 2007

**Field Investigation:** It was decided to reinvestigate the child and also take contact samples from the close contacts, given the non availability of any documented case of polio and also the geographical situation of the region. A Field investigation team was formulated, with members from MoPH, WHO and IMC along with some local people. The PPO stayed at Barikote, Narri district of Kunar and sent two teams who entered Bargematal through district Kamdesh. The location of village Seed abad was around 100 kilometers from Barikote and the travel time is around 8 hours. The total distance from Asadabad, Kunar is 180 kilometers and travel time is 14 hours, while the total distance to Jalalabad is 280 kilometers and travel time is 17 hours.

Following activities were carried out by the team:

- The first team brought the index child and its family to Asadabad and then onwards to Jalalabad for further examination and investigation
- The second team carried out Field investigation and vaccination coverage survey and took 5 stool samples from the close contacts of the affected child.



**a. Assessment of OPV Vaccination Coverage in the Area:**

Immunization coverage, both routine and campaigns was evaluated in the index case area, village Saeedabad of Bargematal district through a household survey done by the members of the Field Investigation team. Both Campaign (March and April NIDs, 2009) and Routine OPV coverage was assessed through house hold visits. The house hold survey data showed a very high level OPV coverage in NIDs and routine immunization coverage of 56 % in the index village. (Table 2).

A total number of 250 households, with a total of 448 children under 5 years - 228 male and 220 female, were assessed in the index and three surrounding villages. Of these 66 children were below one year of age (15 %), 73 between 12 to 23 months old (16 %), 121 between 24 to 35 months (27%), 91 between 36 to 47 months (20 %) and 97 children 48 to 60 months of age (22 %). As for the routine vaccination, most of the children, 207 (46 %) had received three or more than three OPV doses, 69 (15 %) had received two OPV doses, 26 (6 %) received only one dose and 146 (33 %) children did not receive any vaccine through the Routine vaccination program.

During 2008 there have been 7 OPV campaigns in the area – 3 mOPV3, 2 mOPV1 and two tOPVs, while in 2009, 3 vaccination campaigns have been held in Nuristan- one mOPV1 and 2 tOPV.

**Table 2: Results of household survey of OPV Coverage - SIAs and Routine in village Saeedabad, district Bargematal, Nuristan 2009**

March and April, 2009		Routine OPV3 Coverage ( % age) (Three or more doses)
Round of NIDs	SIA OPV Coverage %	
March	100	46 %
April	100	

**b. Analysis of PCA data: Jan – November 2008 and Jan-March, 2009 SIAs:** Post Campaign Coverage Assessment data of NIDs, January – November, 2008 and Jan-March, 2009 was analyzed to assess the quality of campaigns in the whole district of Bargematal, with a total target population of 4,398 under 5 yrs. Analysis of the PCA of January - November 2008 and Jan-March, 2009 revealed consistently high campaign quality with higher PCA coverage of above 95 % in the district and particularly in whole index case area (clusters A) except in January, 2009 finger mark survey shows 92 % coverage. This has also been substantiated through percentage of PCA finger marking. (Table 3).

**Table 3: Cluster wise NIDs Post Campaign Coverage Assessment Results (PCA) Bargematal district of Nuristan province – 2008 – 2009**

Month	2008															2009				
	Jan		Feb		Mar		Apr		Jun		Aug		Oct		Nov		Jan		Mar	
Cluster	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %	Cov %	FM %
A	97	99	97	97	100	100	99	99	100	100			100	100	95	96	100	92		
B	99	93	98	98	95	100	98	100	100	100	96	88	97	96	97	100	96	88	100	100
C	99	99	100	99	97	97	100	100	98	98	96	90	96	96	96	100	98	79	100	100
D	96	96	100	100	100	100	97	96	97	93	96	96	100	100	98	98	100	99	100	100
E	94	94	100	97	100	100	97	91	96	96	95	95	100	98	98	98	100	100	100	100
F					100	100	99	95	97	97	96	96	100	100	95	95	100	100	100	100
Bargematal	99	99	99	99	97	97	98	97	98	97	96	93	99	98	97	98	99	94	100	100

Note: Being a cross border district, 100 % clusters were assessed.

Table 4 shows the number of clusters below 95 % by round in district Bargematal during January – November, 2008 and January to March, 2009. Analysis of the PCA of district Bargematal by age group shows almost the same coverage among target children aging 0 - 11 months compared to those aging 12 - 59 months old, reflecting that the teams in these clusters are appropriately covering younger children.

**Table 4: Post Campaign Assessment (PCA) Results – OPV Coverage by round by age group, Bargematal district: 2008 – 2009**

2008 - 2009 PCA		
NIDs	# of clusters evaluated	# of clusters below 95 %
January	5	1
February	5	0
March	6	0
April	6	0
June SNIDs	6	0
August	6	0
October	6	0
November	6	0
January, 09	6	0
March, 09	5	0

**c. Door to door Active case Finding: Search for Polio / AFP Cases, unvaccinated children and health education:**

Assisted by local campaign volunteers and vaccination staff a door to door search was carried out in the village in order to:

- a. Recheck the area for any unvaccinated child from the recently concluded NID (April 12 -19, 2009)
- b. Active search for any polio / AFP cases
- c. Carry out health education and awareness activities in the area

A total number of 250 households were visited in village Sayedabad and surrounding villages by the trained volunteers of the area. No case of AFP was found during house to house search. No missed child found from April 12-19, 2009 vaccination round.

**Sensitivity of AFP Surveillance:**

The analysis of AFP surveillance performance indicators has shown a visible improvement at the district, provincial and regional levels and confers to the globally set targets. Comparison of the 2006 -2008 and mid April 2009 data at provincial levels indicates satisfactory upward trends in most of the surveillance indicators. (Table 5). Nuristan province reported 4 AFP cases in 2007, 2 AFP cases reported in 2008 and 3 AFP cases reported in by mid April 2009. The median OPV doses of AFP cases for Nuristan province is 18 in 2009 compared to 12 doses in 2007 and 16 doses in 2008. Stool adequacy indicator showed 100% in all the three years (from 2007 to date).

At the regional level the AFP surveillance indicators shows a good trend year by year from 2006 up to the mid April, 2009. Stool adequacy rate is 86% in 2006 while 98% is in 2009, case reported within 7 days is 69% in 2006 while 86% in 2009. Median OPV doses of AFP cases are 15 in 2006 while 18 in 2009 at the regional level. EV isolation rate was 28% in 2006 while it is 6% by mid April 2009, though still some AFP cases are pending in the lab. Specimen reached to the Lab within 72 hours of second sample collected is 94% in 2006 while it was 97% in mid April 2009.

**Table 5: AFP Surveillance Indicators in Nuristan Province 2006 - 2009**

Variable	Nuristan			
	2006	2007	2008	2009
Expected AFP cases	1	1	2	2
Reported AFP cases	1	4	2	3
Age Range	144 months)	24-120 Months	48-60 months	24-96 months
Median Age (in months)	144	50	54	48
Median OPV Doses (Routine + NIDs)	0	12	16	18
Sex	Male	1(100%)	3(75%)	2(100%)
	Female	0	1(25%)	0
Cases detected within 7 days from onset of paralysis	100%	75%	100%	67%
Cases investigated within 48 hrs of reporting	100%	100%	100%	100%
Specimens sent to the lab within 72 hours from second specimen collection	100%	100%	50%	100%
Non Polio AFP Rate	1.0	4.0	1.0	5
Stool adequacy rate	100%	100%	100%	100%
EV isolation rate	1000%	25%	0%	0%
No. Polio cases	0	0	0	1
Polio compatible	0	0	0	0

Note: 2009 includes data by April 15, 2009

Nuristan province is very thinly populated and the population density is around 20 people / square kilometer. Accordingly the number of expected AFP cases is very low. Districts Burgimatal, Kamdesh, Wama, Waigal and Mandol had to report one AFP case in 5-10 years (based on 2/100,000 target population), while only province Nuristan has to report 1 case per year.

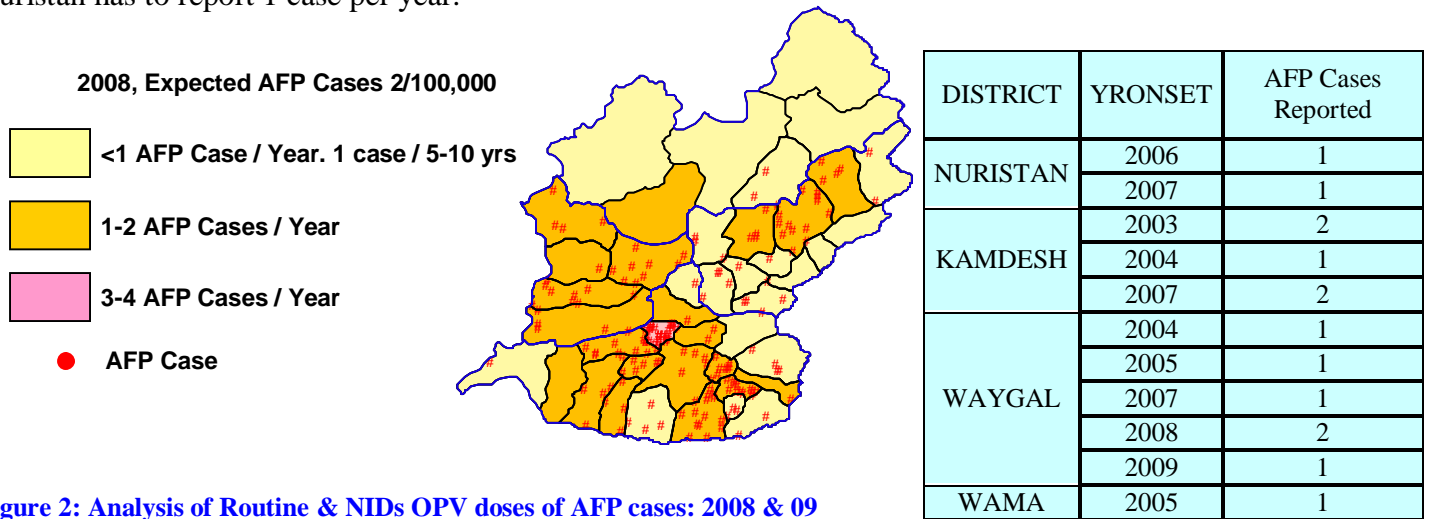


Figure 2: Analysis of Routine & NIDs OPV doses of AFP cases: 2008 & 09

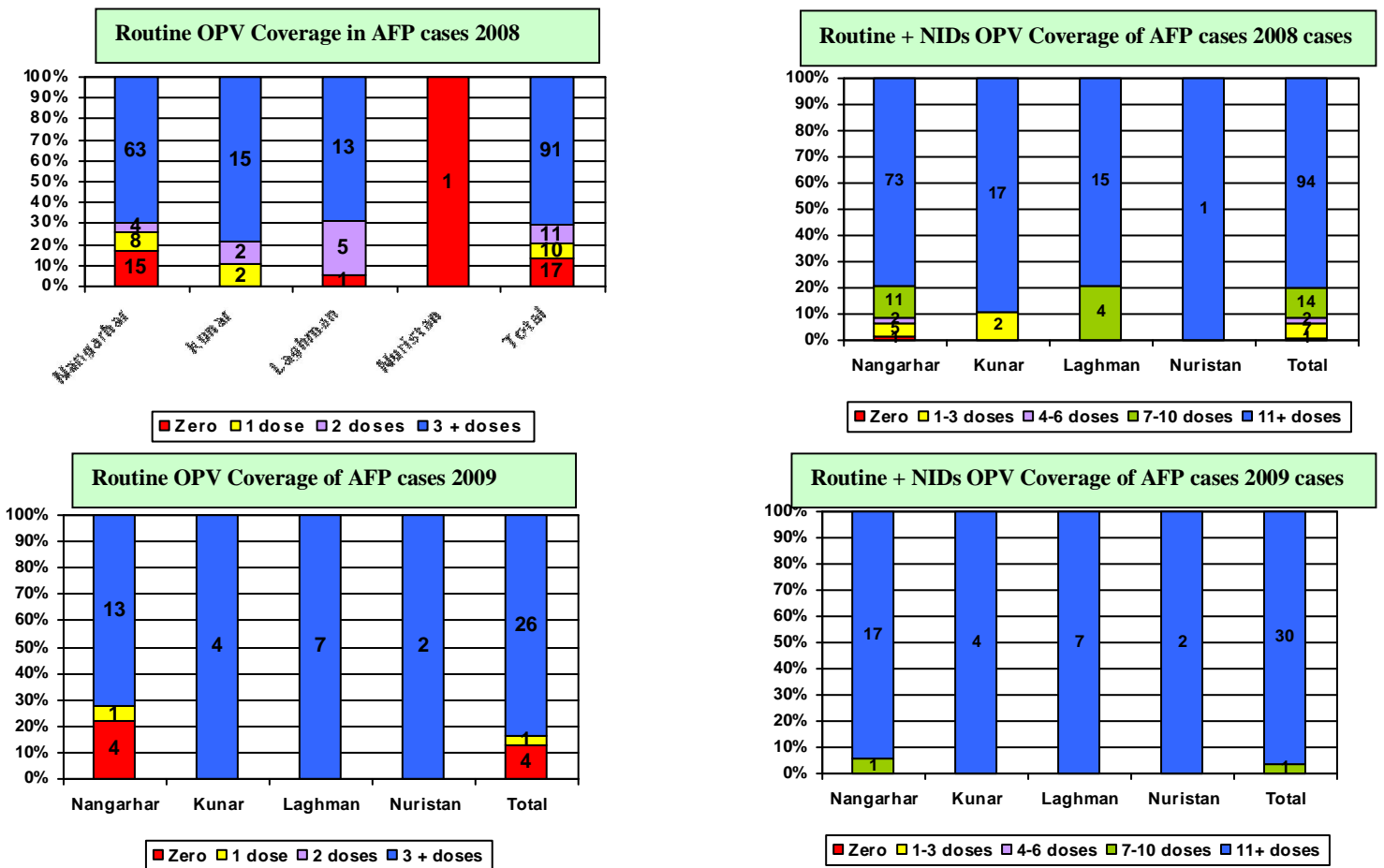


Figure 2 shows the analysis of Routine and Campaign OPV doses among the reported AFP cases less than 5 years of age by April, 2009 at the provincial and regional levels. Most of the cases in Nangarhar (72 %) have received 3 or more OPV doses in the Routine EPI. In Kunar, Laghman and Nuristan provinces all the reported



AFP cases received 3 or more than 3 OPV doses in routine EPI (100%). Routine plus campaign OPV doses coverage among AFP reported cases by mid April 2009 is 94% for Nangarhar and 100% for all the other three provinces - Kunar, Laghman and Nuristan.

### **Discussion and Conclusions:**

The Eastern Region, particularly Nangarhar has the history of occurrence of one sporadic polio case per year from 2001 to 2006. In 2007, the Eastern region reported 2 cases of Polio (WPV 1) in Mehterlam (Laghman province) and Jalalabad (Nangarhar province). The genetic sequencing linked these cases with the cases from NWFP (Pakistan).

During 2008 three NSL3 were isolated from the Eastern Region – all from Jalalabad city. The first NSLP 3 case (AFG/06/08/070) was detected from the Behsud area of Jalalabad in a nine months year old boy, in May 08. This was after a period of three years when the last NSLP 3 case was identified in 2004 from Jalalabad city sub district A. Subsequently, two more cases were reported from Jalalabad city, one each from Naranjbagh (central Jalalabad) and Joe 11 area of Jalalabad in June and November. Last P1 in the Eastern region was in June 2007.

Occurrence of NSL1 type of polio virus from one of the districts of Nuristan of Eastern region is of supreme importance particularly in assessing the immunity barrier in the area and preventing further circulation by implementing appropriate measures.

There is no documented evidence of isolation of polio virus from Nuristan from the last decade. However, in April 1999 an NSL1 case was isolated from the neighboring Kunar province. Earlier in November, 1997 the first NSL1 was confirmed from the same province, soon after the initiation of AFP Surveillance activities in the region in the same year. Nuristan is very thinly populated with very little cross border movement and largely static population. The local people move to higher altitudes during summers and return back during the winters. There is no regular cross border point with Pakistan, though some ‘informal’ movement takes place from the Kamdesh district of Nuristan (Peshawarak) and Bamboraat area of Chitral (NWFP).

It is difficult to track down the exact source of infection based on this epidemiological analysis. There are different possibilities.

- The possibility of an indigenous virus in Nuristan/Eastern region with low level of transmission and remained undetected for two years. However, in the presence of reasonably sensitive surveillance system and absence of any case found during our active search, this probability remains minimal.
- NSL1 circulation is present in the Bajour & Mohmand areas of Pakistan. During the active fighting in Bajour districts, families moved towards Kunar province of Eastern region which is neighboring Nuristan. There is a possibility that some of these families, which are not identified during this investigation, might have come to certain parts of this area and have introduced this virus with occurrence of this sporadic case.
- In either case, the quality of campaigns in past, vaccination status of AFP cases (Median Dose: 16 in 2008), suggestive of reasonable immunity barrier in this community and compounded with low density scattered population and harsh winter, it appears that the circulation will not spread outside this geographic area.

### **Actions taken / Planned:**

The established genetic link between the viruses isolated on both side of the borders has established the persistent presence of a transmission axis, between the eastern region of Afghanistan and the tribal areas of the NWFP and Peshawar.

The following actions were taken / needs to be taken to ensure high level of OPV coverage and surveillance sensitivity:

- **Cross border Population movement:**

A Cross border Coordination mechanism exist between the Eastern Region of Afghanistan and NWFP, with sharing of campaign and surveillance data, Joint supervision and monitoring of the cross border vaccination points. A very high level of OPV coverage among the population moving between the two countries is ensured through.

**Cross border vaccination Posts:** Three provinces of the Eastern Region – Nangarhar, Kunar and Nuristan have borders with the North West Frontier Province of Pakistan. People cross over through six formal crossing points between the two countries. Vaccination teams are placed on all of these cross border points along the Pakistan – Afghanistan borders in the provinces of Nangarhar and Kunar, who vaccinate the outgoing and screen the incoming children for vaccination. CB vaccination posts have been strengthened with shelters, cold chain, regular payment of incentives to the vaccinators and closer supervision and monitoring.

**Bordering districts:** There are a total 16 bordering districts in Kunar and Nangarhar, with a total estimated population of 500,000. The independent Post campaign monitoring data suggest above 95 in most of the clusters in these district. All vaccinating teams are locally selected and have no access issues despite grave security situation along the border areas. A sensitive AFP surveillance system is in place in the border districts, evident from the fact that 45 cases of AFP against an expected number of 9 cases (25 % of the total AFP cases reported from the region) have been reported from these districts in 2008.

**Returnees from Pakistan:** For the Returnees coming back from Pakistan, Coordination and exchange of information has been enhanced through weekly co-ordination meetings and information sharing with the UNHCR, UNICEF, MoPH and the repatriation department. OPV and Measles vaccination is given to all returnee children at the Momindara repatriation centre. Nine camps have been established for returnees, in the provinces of Nangarhar, Kunar and Laghman. Total registered target children in these camps are 7,209. OPV coverage is nearly 100 % and AFP surveillance activities are regularly conducted in these camps.

**Bajaur Refugees:** The influx of a large number of refugees from Bajaur, NWFP, Pakistan in wake of the ongoing Military operation in the area to the bordering districts of Kunar was carefully monitored and two rounds of OPV3 vaccination and two rounds of tOPV have been held among these refugees, who have a very low immunity level as several vaccination campaign could not be held in Bajaur, because of insecure conditions.

- **Placement of PPO in Nursitan:** During the later half of 2008 a PPO was recruited for Nuristan. The PPO is based in Nuristan and has a number of years of experience of working in the region and enjoys good relations with the Health implementation NGO – the IMC. He travels inside most of Nuristan, knows the

local language, however two of the six districts - Burgimatal and Mandol are outbound because of security concerns.

- **Coordination with IMC (International Medical Corps) for PEI / EPI and MoPH:**

A meeting was held Mr. Zach Zaneck, Program coordinator of the IMC - the NGO implementing the MoPH Health Package in Nuristan in order to improve PEI and EPI services in that geographically in accessible and security compromised area. As no first hand knowledge of the quality of vaccination is available due to lack of adequate supervision and monitoring, a more credible implementation and monitoring of the campaign and surveillance activities was discussed. A subsequent meeting, which will include MoPH staff is proposed involving the operational level field staff for the micro planning for the fixed, out reach and mobile vaccination activities.

- **Orientation of Focal Points, Private practitioners and hospital staff:**

Orientation / refresher trainings for all the Surveillance focal points, busy private practitioners and hospital staff have been planned and will be implemented after the availability of requested funds. The IMC will be requested to that all the Surveillance Focal points hold a monthly meeting of all the Community based reporter and document the proceedings.

- **mOPV 1 and Measles campaign:**

A six day OPV 1 and Measles campaign (April 12-19, 2009) has just been concluded. Currently Post campaign monitoring is being conducted. A subsequent round of vaccination with OPV 1 may be considered.

- **Improving Quality of Campaigns**

**Selection of Vaccination teams, Supervisors:** It is ensured that the vaccinations teams, supervisors and district coordinators are selected from the local levels who are well known in the area and have local acceptability.

**Pre campaign Training on the Implementation of Vaccination Campaign:** Good quality, problem oriented and practice based trainings are regularly held for all level of campaign workers. Training for the Eastern and central Nuristan is held in Asadabad (Kunar) and for the western Nuristan is held at Mehterlem (Laghman), facilitated and monitored by the senior Staff at the Regional levels, including the medical officer.

**Supervision and Monitoring:** Supervisors and monitoring is done by the same individuals and are selected largely from outside Nuristan. Supervisors cum monitors for the Eastern / central and western Nuristan are selected from Kunar and Laghman respectively. These independent monitors oversee all the phases of the campaign implementation, including trainings, Intra-campaign and post campaign monitoring. They are reasonably reliable, very well aware of the area and have no problems in moving around.