
Immunization

Repeat Process Evaluation of Pulse Polio Immunization

**Kaushik Banerjee
K. Suresh**

The Government of India initiated the National Immunization Days or the Pulse Polio Immunization (PPI) in 1995 to achieve polio eradication by the year 2000 AD. The strategy is to provide two additional doses of OPV to all children less than five years old on two single-days in a year. PPI days are organized during the low transmission season of polio viruses at an interval of 6-8 weeks.

Last year, a process evaluation protocol was designed by Government of India (GOI), United Nations Children's Fund (UNICEF) and World Health Organization (WHO) consisting of a rapid qualitative evaluation by independent observers throughout the country. The process evaluation was carried out on the first day of the PPI to provide information for improving the effectiveness of the day 2 activities(1). Following a good response for the PPI process evaluation last year and its utilization in fine tuning the subsequent round, the Ministry of Health and Family Welfare

*From the MCH Section, Ministry of Health and Family Welfare, Government of India, Nirman Bhawan, New Delhi 110 001 and *Health Section, United Nations Children's Fund, India Country Office, UNICEF House, 73, Lodi Estate, New Delhi 110 003.*

Reprint requests: Dr. K. Suresh, Project Officer, Health Section, United Nations Children's Fund, India Country Office, UNICEF House, 73, Lodi Estate, New Delhi 110 003.

(MCH Section) and other donor agencies realized the need for the same this year also and entrusted the responsibility to UNICEF.

Methodology

The three-part instrument developed last year(1) was modified and used on December 7, 1996. Part 1 surveyed the principal coordinator at each immunization post (IP), Part 2 was for recording the observations of the surveyor, and Part 3 was a protocol for exit interviews of four participants in the program. Each part of the instrument was designed to take less than five minutes to complete giving a total maximum time of 30 minutes for a full observation of one IP to be completed. It was anticipated that each volunteer would visit at least one IP.

Ten thousand protocols were printed and distributed through regular mail service to volunteers from different professional fields throughout the country. The volunteers were identified from the government, state and district health administrators, officers of other departments (*i.e.*, Women and Child Development, Education, Rural Development, Urban Development, Zilla Parishads), medical college faculty, Rotarians and other Non Governmental Organizations (NGO)s. The total number of protocols distributed cannot be reliably determined, as many volunteers independently photocopied the forms and distributed them to colleagues. All volunteers were asked in an accompanying letter to fill in each of the protocols and return them to a common address in an accompanying letter to fill in each of the protocols and return them to a common

address in the Ministry of Health and Family Welfare (MOHFW). The analysis of the protocols was done by the Institute of Research in Medical Statistics (IRMS), Indian Council of Medical Research, New Delhi.

About 5000 protocols were returned duly completed. However, only 4210 forms which were received before 31st December, 1996 were analyzed as it was decided that feedback to states should be given latest by 10th January, 1997 to facilitate fine tuning the activities for the 2nd round of PPI due on 18th January, 1997. The draft report was shared in the National Health Council Meeting on the 9th January, 1997.

Results

Some of the protocols received were not complete in all respects and therefore the denominator keeps changing for different variables. The observers (n=1422) included medical college faculty (25%), health departments' doctors (21%), health department's other supervisory officers (10%), UNICEF, WHO and other donor partners (24%), Rotarians (9%), NGO's and private individuals (8%) and government officers of other departments (3%).

Immunization Posts and Staffing

A total of 4210 PPI booths in all 32 states and UTs were visited by observers (*Table I*). Of the booths visited, 42% were urban, 52% rural, 5% urban slum and 1% tribal and transit points. Countrywide, a little over half of the booths visited were in rural locations. However, in the states of Gujarat, Karnataka, and MP, more than 2/3 of the booths visited were in urban areas and in the states of AP, Assam, Haryana, Orissa, it was the reverse. In HP and Delhi, only urban booths were covered and the remaining states had equal distribution. Maharashtra contributed to roughly 24% of observations.

TABLE I-Booths Visited.

State/UT	1995	1996
AP	61	280
Assam	8	73
Bihar	23	275
Goa	2	-
Gujarat	56	207
Haryana	33	118
HP	22	34
JK	7	-
Karnataka	47	136
Kerala	28	102
MP	55	257
MH	48	992
Orissa	39	283
Punjab	30	141
Rajasthan	108	140
TN	241	186
UP	86	450
WB	66	129
NE	7	168
UT	43	206
Delhi	60	33

AP-Andhra Pradesh; HP-Himachal Pradesh; JK—Jammu and Kashmir; MP-Madhya Pradesh; MH-Maharashtra; TN-Tamil Nadu; UP-Uttar Pradesh; WB-West Bengal; NE—North Eastern States; UT—Union Territories.

About 36% of the PPI coordinators were medical doctors, 31% were health and other government staff and 33% NGOs and others. Manpower at the IPs (*Table II*) was at an average of 7.82 as against the recommendation of 4. The states of Maharashtra, AP, MP and UP had more than 10 people on an average in each booth. The manpower of different sectors ranged between 0.57 (NGOs) to 1.54 (health) per booth. The health sector was contributing to only 20% of the entire manpower at these booths.

TABLE II-Number of Workers at Booth (Average per Booth).

State/UT	Health workers	Teacher	NGO	Armed forces	Anganwadi workers	Students	Community workers	Other
AP	1.01	2.52	0.89	0.04	0.78	2.29	0.66	1.32
Assam	1.12	0.60	0.19	0.03	0.07	2.96	2.47	0.40
Bihar	1.49	1.79	0.69	0.00	0.86	0.96	0.93	0.28
Gujarat	0.76	0.67	0.43	0.00	0.28	0.60	0.79	2.00
Haryana	0.71	0.96	0.61	0.00	0.88	0.67	0.66	0.37
HP	0.59	0.00	0.00	1.24	0	0	0	0
Karnataka	1.14	0.95	0.70	0.04	0.60	1.09	0.53	0.32
Kerala	1.82	0.26	0.00	0	0.36	1.38	0.33	0.21
MP	3.45	3.65	0.41	0.08	0.08	0.14	0.71	2.75
MH	1.40	1.69	0.40	0.04	1.49	1.38	0.51	0.61
Orissa	1.14	1.80	1.36	0.25	1.00	0.99	0.57	0.83
Punjab	1.38	0.61	0.63	0	0.89	0.58	1.74	0.39
Rajasthan	1.54	2.45	0.44	0.06	1.09	1.27	1.20	0.84
TN	1.67	0.41	0.69	0.06	1.25	2.17	0.64	1.23
UP	1.28	0.73	0.70	0.03	0.22	3.65	2.48	2.67
WB	2.38	0.41	0.19	0.06	1.04	0.12	1.29	1.71
NE	2.26	0.41	1.11	0.16	1.15	0.96	1.30	0.95
UT	1.58	0.64	0.26	0.18	1.29	0.86	0.99	0.47
Delhi	2.91	0.42	0.09	0	0.85	1.64	0.18	1.52
India	1.52	1.37	0.57	0.07	0.92	1.34	0.93	1.06

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This indicates excellent intersectoral coordination and social mobilization efforts.

Physical Arrangements

The various physical arrangements at booths are summarized in *Table III*. In general, adequate quantity of vaccine arrived in time in 87% of booths. However, the states of HP (58.8%), Assam (33%), Bihar (24%), Gujarat (24%), Kerala (20%), Orissa (27%) and Rajasthan (27%) reported higher percentage of late arrival of vaccines. The concerned states were advised to look into the matter for the session on 18th January, 1997.

The equipments used for carrying vaccines were vaccine carriers (93.3%), day carriers (2.6%) and the remaining were others. However, it was observed that the states of AP (12.1%), Maharashtra (8.9%), Orissa (8.5%) and Delhi (6.1%) used large proportion of vaccine carriers other than recommended. These states were asked to look into the availability of the recommended equipments and streamline the same. Communication materials at the PPI booths (banners, posters) were adequate, except in Assam (42.5%) and Haryana (23.7%) where quite a few IP's did not have these. Countrywide, 2.8% of the observed

TABLE III-Physical Arrangement at Booths (%)

State/ UT	Vaccine arrived on time	Communi- cation material (Banner)	Cold chain equipments used for vaccine			Awareness & action for unreached population	Returned without vaccina- tion
			Vaccine carrier	Day carrier	Others		
AP	100.0	100.0	100.0	0	0	0	C
Assam	67.1	57.5	75.3	24.7	0	0	1.4
Bihar	70.1	100.0	95.0	0.5	4.5	4.5	0
Gujarat	75.8	100.0	100.0	0	0	0	0
Haryana	100.0	76.3	100.0	0	0	0	2.5
HP	41.2	100.0	100.0	0	0	0	0
Karnataka	100	100.0	89.5	10.5	0	0	0
Kerala	74.4	100.0	100.0	0	0	0	0
MP	100.0	100.0	94.5	1.8	3.7	0	0
MH	84.8	99.4	90.7	0	9.3	5.3	5.3
Orissa	70.7	100.0	100.0	0	0	9.3	9.3
Punjab	85.8	98.6	100.0	0	0	0	1.4
Rajasthan	72.9	100.0	97.9	2.1	0	0	0
TN	97.0	94.0	94.0	1.2	4.8	0	0
UP	100.0	97.4	100.0	0	0	0	0.3
WB	100.0	100.0	100.0	0	0	3.1	3.1
NE	93.2	89.2	100.0	0	0	6.8	4.1
UT	97.1	88.2	83.5	16.5	0	2.4	0
Delhi	100.0	100.0	93.9	0	6.1	0	0
India	86.9	96.7	95.0	1.9	3.2	2.8	2.5

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booth coordinators were aware of areas from where children may not come for vaccination and analyzed the reasons to take additional care to mobilize them. Overall about 2.5% children were returned without vaccine, as they were over 5 years of age. This problem was significant (above 5%) in Orissa (8.5%), north-eastern states (6.8%), and Maharashtra (5%).

Cold chain and Service Quality

In spite of the different types of vaccine

carriers used, as much as 99.7% of posts observed had ice in the carrier indicating excellent cold chain maintenance (*Table IV*). Only in about 2% of the booths visited, the screening of age was not being rigidly done. This problem was more in AP (7%), MP (8%) and NE states (12%). The observations indicate that 99% of booths visited were easily identifiable. Generally, the documentation was being done satisfactorily by tally marking (96%). In West Bengal, in 34% of the posts observed names were be-

TABLE IV - *Quality of Services Offered (%)*

State/ UT	Frozen ice present	Age being screened	PPI site easily identified	Record maintained by		
				Tally	Other	Children given >2 drops
AP	100.0	93.0	100.0	97.1	0	10.0
Assam	100.0	100.0	98.6	98.6	1.4	0.3
Bihar	95.5	100.0	95.5	100.0	0	1.1
Gujarat	100.0	100.0	99.0	100.0	0	0
Haryana	100.0	100.0	97.5	97.5	2.5	5.3
HP	100.0	100.0	100.0	100.0	0	0
Karnataka	100.0	100.0	100.0	100.0	0	3.1
Kerala	100.0	100.0	100.0	100.0	0	5.1
MP	100.0	92.0	100.0	100.0	0	1.7
MH	100.0	98.7	98.7	92.8	1.5	3.8
Orissa	100.0	100.0	100.0	100.0	0	3.1
Punjab	100.0	100.0	100.0	98.6	1.4	0.4
Rajasthan	100.0	100.0	100.0	100.0	0	0
TN	100.0	100.0	100.0	100.0	0	0
UP	100.0	100.0	100.0	100.0	0	0.7
WB	100.0	100.0	100.0	65.9	0	0
NE	97.2	88.0	97.2	100.0	0	14.0
UT	100.0	97.6	100.0	100.0	0	0.6
Delhi	100.0	100.0	100.0	100.0	0	0
India	99.6	98.0	99.1	96.7	0.5	2.2

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ing written, which if avoided will reduce the burden on the workers at the booth. An average 2.2% children were being given more than 2 drops among 16,840 children observed. In the states of NE (14%) and AP (10%), it was observed that a large proportion of children were given more than 2 drops. The quality of the dropper (hardness) was quoted as a major reason for this observation. The agewise distribution of recipients that children in the age group of

25-36 and 49-60 months might have been missed, as their distribution when compared to normal distribution was significantly low. However, this may also represent observer's bias, as there is a tendency to talk to mothers with younger children.

Communication and Community Education

The role of television has been only second to the wide health infrastructure, in

TABLE V—Source of Information of PPI

State/UT	Source							
	Health staff	Teacher	Relation	Radio	Poster	Anganwadi worker	Student	TV
AP	43.6	13.2	7.5	3.9	2.9	10.0	1.4	17.5
Assam	64.4	0	0	0	0	0	4.8	30.8
Bihar	35.1	8.0	8.1	1.1	0	1.1	0	46.5
Gujarat	33.1	0.7	16.9	0	0	1.4	14.5	33.3
Haryana	23.7	3.2	15.3	0.2	0	33.1	4.7	19.9
HP	29.4	0	0	55.9	0	0	0	14.7
Karnataka	23.7	7.9	6.1	4.4	0.9	4.4	2.6	50.0
Kerala	41.7	1.3	8.3	1.3	0	19.2	0	28.2
MP	25.5	8.6	9.0	16.4	0.1	0	3.0	37.4
MH	67.5	2.9	3.5	0.4	0.7	7.4	1.1	16.4
Orissa	58.2	1.9	21.5	0.5	0.8	13.1	0	4.0
Punjab	63.3	7.3	5.0	1.1	0	3.5	0	19.9
Rajasthan	47.2	13.4	5.6	4.6	0	4.1	1.5	23.6
TN	69.6	0.6	1.2	2.4	0	2.7	0	23.5
UP	43.1	1.0	18.3	11.6	0.5	1.0	2.0	22.6
WB	30.4	0	19.6	2.3	2.7	12.2	1.6	31.2
NE	64.2	0	4.1	3.7	6.8	6.1	3.4	11.8
UT	45.6	2.9	10.0	7.8	1.3	7.2	0	25.1
Delhi	14.8	0	0	0.8	0	0	0	84.4
India	49.9	3.9	8.9	4.0	0.9	6.5	2.1	23.9

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creating awareness about the need of these additional doses. Anganwadi workers, teachers and relatives have also been the source of information (*Table V*). Overall, the utility of these additional drops were known to 91% and the next date to all (*Table VI*). However, a significantly large number of parents of the beneficiaries in Assam (26%), Bihar (23%), West Bengal (39%), MP (23%) and UT (16%) were not aware of the utility of the additional drops. Only 4% were not aware as to what vaccine

was being given. This proportion was more in AP (12%), Haryana (17%), WB (16%) and North Eastern state (17%).

Suggestions for Improvement

The qualitative suggestions and remarks that emerged for further improvement were: (a) Coordinator: (i) To provide instrument to open the vaccine vials and better quality droppers. This was mainly for indigenous supplies, (ii) Incentive in terms of money, lunch, tea and vehicles to

TABLE VI—Awareness About Immunization

State/ UT	Awareness of the next date	Utility of drops		Awareness of vaccine being given
		Prevent polio	Others	
AP	100.0	90.0	10.0	88.2
Assam	100.0	74.3	25.7	94.2
Bihar	100.0	77.4	22.6	94.8
Gujarat	100.0	94.0	6.0	94.0
Haryana	100.0	83.3	16.7	82.6
HP	100.0	100.0	0	100.0
Karnataka	100.0	95.7	4.3	96.5
Kerala	100.0	97.8	2.2	100.0
MP	100.0	76.8	23.2	98.2
MH	100.0	97.0	3.0	97.1
Orissa	100.0	95.5	4.5	95.9
Punjab	100.0	95.4	4.6	95.4
Rajasthan	100.0	95.4	4.6	95.7
TN	100.0	95.5	4.5	94.4
UP	100.0	95.8	4.2	94.4
WB	100.0	61.0	39.0	83.7
NE	100.0	97.0	3.0	83.1
UT	100.0	85.9	14.1	79.1
Delhi	100.0	90.9	9.1	92.4
India	100.0	91.0	9.0	93.6

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be given to the staff engaged at the immunization booths. However, looking at the financial implications, this may be difficult to implement, (b) Parents: (i) Provision of mobile PPI centers to cover backward/remote areas. (ii) To make some arrangement for incentive to the persons engaged in the programme, (c) Observers: (i) Dates should be uniform as of previous years and be declared government holidays, (ii) IEC material (banner and wall writing) should be distributed two or three days prior to PPI days. (iii) Arrangement for additional vaccines should be made to cover over 5

years' old children.

Comparison with Earlier Process Evaluation

Table VII compares the findings of the process evaluation reports of 1995 and 1996. The findings of the two process evaluation surveys above may not be directly comparable because of the different distribution of types of posts and the number of posts visited. However, the information suggests that staff skill and cold chain maintenance (as measured by presence of ice in carrier) was excellent this time. The increased proportion in delay of vaccine ar-

TABLE VII-Comparison of Process Evaluation Results for PPI for the Years 1995 and 1996.

PPI posts visited	9th December 1995			7th December 1996		
	1070	Urban	54%	4210	Urban	42%
		Rural	28%		Rural	52%
		Urban slums	13%		Urban slums	5%
<i>Staff skills (%)</i>						
Children given more than 2 drops of vaccine	5			3.3		
<i>Vaccine supply (%)</i>						
Shortage of vaccine	8			Nil		
Delayed vaccine arrival	5			12		
No ice present in vaccine carriers	3.6			0.3		
<i>Communication (%)</i>						
Easily identifiable booth reported	97.6			99		
Awareness of hard to reach areas and additional care taken to reach them	15			2.8		
<i>Recipients (%)</i>						
Children returned without vaccine	0.2			2.5		
<i>Community education (%)</i>						
Awareness of what vaccine being given	15			6.5		

rival this year may be due to coverage of more rural and remote booths in the survey. The last year's additional efforts to identify and mobilize hard-to-reach population groups led to reduction of such pockets in 1996 as reflected by the booth coordinator's awareness, analysis and action taken.

Discussion

The same authors had reported that PPI on 7th December, 1995 was clearly a remarkable achievement of community mobilization, logistical planning, support and community participation(1). This year's data suggests that GOI, MOHFW, MCH Section was not only able to sustain that effort but fared better. Good quality vaccine was supplied in adequate quantity and

maintained in excellent cold chain which was coupled with requisite quality of services. Posts were easily identifiable and there were fewer pockets from where children may not be brought for vaccination.

The social mobilization and communication efforts resulted in children over 5 years too reporting for vaccination (5%). The awareness about date for second additional dose was known to 90% and its utility to 91%. This indicates an improved situation when compared to the previous year. However, 6% of parents did not know the name of the vaccine. The importance of mass media specially, television as a main means of communication was reported both in rural (35%) and urban areas (70%). Interpersonal communication played a

larger role in rural (65%) and urban slums (42%).

The use of this low cost survey method provided decision makers with timely information necessary to revise or finetune the arrangements for the PPI day on 18th January 1997. It also indicated the improvement in the processes over the previous year. By enlarging the reach of the survey to more rural and urban slums, it was also possible to know organizational problems in these areas like delayed arrival of vaccine and need for interpersonal communication. Despite non-random sampling, information was collected from a sufficient number of respondents to discern patterns of strengths and shortcomings in different

states and socio-geographical (urban, urban slum, rural and tribal) situations.

The sustained, expanded and improved but easy to implement qualitative evaluatory process provided an indication that the country had the capacity to immunize around 119.8 million children on a single day. Further, this low cost and rapid process evaluation proved invaluable in providing the requisite feedback before the targeted date (10/1/97).

REFERENCE

1. Sokhey J, Atwood S, Andrus J, Suresh K, Banerjee K. A process evaluation of pulse polio immunization. *Indian Pediatr* 1996; 33: 257-261.