EGYPT INDEPENDENT MONITORING OF POLIO NATIONAL IMMUNIZATION DAYS

POST CAMPAIGN MONITORING CONDUCTED BY THE HIGH INSTITUTE OF PUBLIC HEALTH, ALEXANDRIA UNIVERSITY (HIPH)

2014

World Health Organization

ACKNOWLEDGEMENTS

The post-campaign monitoring (PCM) survey was conducted by The High Institute of Public Health, Alexandria University (HIPH), which designed and conducted the field survey in collaboration with Ministry of Health and Population (MOH) and The World Health Organization (WHO). The PCM survey has been made possible by generous support and funding from the WHO and the technical support of Dr. Nasr Eltantawy, WHO Egypt.

The core team from HIPH included Prof. Mohamed A El-Barrawy, Dr. Moataza M Abdel Wahab, and Dr. Noha S Moustafa, who participated in the design, field work, data entry and analysis. Recent graduates of the faculty of medicine, students and graduates of the HIPH conducted the field work of data collection. Their enthusiasm and eagerness for perfection led to the success of this activity.

I would like to express my appreciation to the MOH staff at the national, governorate and district levels for facilitating the field work. I would like to thank the WHO team (Drs Rehab, Nasr, Ibrahim, and Abdi) for editing the final report. I would also like to express my thanks to the families who participated in the PCM survey.

Finally, I would like to thank Dr. Henk Bekedam, WHO Representative for Egypt for his excellent support and facilitation of the survey.

Ibrahim Kharboush

Professor of Maternal and Child Health

High Institute of Public Health

Alexandria University

http://www.portal.alexu.edu.eg/Services/staff/ikharboush/index.php

INTRODUCTION

The Arab Republic of Egypt has achieved major milestones towards polio eradication since the establishment of the polio eradication program in the early 1990s. The last indigenous polio case was reported from Assiut in May 2004. The last environmental sample with indigenous WPV was reported in January 2005 and Egypt was certified as polio free in 2006. This achievement was realized through efforts of health workers in the Ministry of Health (MOH) with support of international partners. Egypt has received technical and financial support from a variety of partners including WHO, UNICEF, USAID, and other Global Polio Eradication Initiative (GPEI) partners. The major pillars of polio eradication in Egypt are strong routine immunization, mass immunization campaigns (National Immunization Days (NIDs)) and robust AFP and environmental surveillance. Routine immunization against polio has been mandatory since 1968. Limited and targeted immunization campaigns started in 1976, however, since 1989 annual NIDs were conducted. The house-to-house strategy was adopted in 2000 and became a national strategy in 2002. Multiple yearly national immunization days were conducted between 2002 and 2005 until eradication of wild virus circulation. Since then, an average of two NIDs has been conducted annually.

Unfortunately, in late 2008, two environmental wild viruses were detected with virus imported from Sudan and India, respectively. Importation related to the north Sudan virus was detected in December 2010 from a sewage water sample collected from Aswan. More recent, during December 2012 wild poliovirus was isolated from sewage samples collected in two areas of greater Cairo. Genetic sequencing analysis showed that the isolated virus closely matches a Pakistan environmental isolate collected during September 2012. This was considered an importation of WPV1 from Pakistan into Egypt and was followed in February 2013 by detection of wild poliovirus in environmental samples collected in Israel and Palestine and in October 2013 by an outbreak in Syria. Genetic sequencing indicates that the Syria isolates were most closely linked to the environmental viruses detected in Egypt. Differences in genetic sequencing of viruses isolated from the four countries indicated undetected circulation in the region.

Following the confirmation of the positive environmental sample, small scale supplementary immunization activities (SIAs) were conducted in February in Al Hagana and Al Salam followed by two SNIDs in Greater Cairo (3.4 million children) in March and April. Furthermore, Egypt was included in the Phase I WHO/UNICEF comprehensive multi-country strategic plan for a polio response in the Middle East that was put together in response to polio outbreak in October 2013 in Syria. As part of Phase I, Egypt implemented two NIDs in November and December 2013 (14 million).

In addition and in response to detection of polio in environmental samples in Gaza Strip in March 2014, Egypt implemented a mass polio vaccination campaign in the governorates bordering Gaza— North and South Sinai governorate.

The review meeting of the Phase I WHO/UNICEF Strategic Plan for Polio Outbreak Response held in March 2014 in Amman, Jordan recommended that all countries implement post-campaign monitoring (PCM) of all SIAs. Post-campaign monitoring is an objective measure of SIAs quality that can be used to guide improvements to reach more children by enabling corrective action both during SIAs and in planning for the next rounds. The High Institute of Public Health, Alexandria University with the support of WHO Egypt implemented independent post-campaign monitoring immediately following the April 2014 NIDs.

MATERIALS and METHODS

METHODOLOGY

The methodology of the April 2014 PCM was based on the standard WHO Independent Monitoring guideline (1). Post-campaign monitoring was carried out in all the 25 governorates in Egypt except from North and South Sinai governorate, where PCM could not be conducted because of safety reasons. The type of monitoring used in this survey was end-process monitoring including:

- House to house monitoring
- Market survey (out of house monitoring).

SAMPLING

Sample size was calculated to be 1% of the target population. The estimated total population of under-five children in the districts selected for PCM was 2,250,000. Accordingly the estimated sample size was 22,500 children. To reach the targeted sample size, in each selected district one sub-district was surveyed per day for a total of three days. The team visited 4 areas in the sub-district. In each area a cluster of 7-10 households were visited to survey for polio vaccination. In addition, the markets (out of house) of the sub-districts were surveyed to include 40 parents of under-five children.

The designed questionnaires was translated into Arabic and revised by the core team and the WHO Egypt technical team. The questionnaire captured information on age, house marking, vaccination and finger marking of the child, cause of not vaccinated and source of information about campaign.

TEAM RECRUITMENT, TRAINING AND LOGISTIC

Recent graduates of the faculty of medicine, students and graduates of the HIPH were recruited to carry out the data collection. A total of 240 member were included, two per each district. Supervisors were selected from the HIPH.

[1]http://www.polioeradication.org/Portals/0/Document/Resources/PolioEradicators/IndependentMonitoringGuidelines_20101124.pdf

The team and their supervisors attended training on 7th April, 2014 in the HIPH. The training was carried by the WHO coordinator and the core team of the survey in the form of interactive lectures followed by small group discussions in the next two days (8–9th April).

WHO Egypt in collaboration with MOH Egypt facilitated the activities of the data collection team. Moreover, HIPH sent letters (fax) to the director of health governorates, in addition to phone calls to introduce the data collection team. A copy of the letter was provided to the team of the corresponding governorate. Team members were provided also with identity cards and maps.

DATA COLLECTION PROCEDURE

The survey was carried out for three days from 10–12th April or 11–13th April in select governorates. MOH provided a local guide for each team without interference in their work. Collected questionnaires were revised by the field supervisors and checked by the core team before statistical analysis which was performed by the statics unit in the HIPH. The entire process was supervised by the WHO coordinator including the training, preparations, and data collection. Districts within each governorate were selected and then divided into four sub-districts. Monitoring teams questioned families with children less than five years of age in homes and in markets. Paper-based questionnaires were completed by teams, with particular attention given to collecting information on any unvaccinated children. Vaccination status was guided both by visual evidence of finger marking as well as by verbal recall.

RESULTS

CHARACTERISTIC OF PARTICIPANTS

A total of 46,735 children under five (11,911 infants and 34,824 from 1 -<5years) from 28,707 families collected from home visits (15,577 households) and from the public marketplaces (13,130 families) were included in the post-campaign monitoring survey. The families studied were distributed along 25 Egyptian governorates.

46,735
children < 5 years surveyed

97.0%
received polio vaccination

86.0%
Had proof of vaccination by finger-marking

QUALITY OF HOUSE MARKING

Among the household surveyed 91.7% (14,290) have reported being visited by the vaccination team. By observation of the houses visited by the campaigns, 88% (12,596 houses) were marked. Furthermore, 92.5% of the houses (11,653) were marked correctly.

Table 1: Distribution of household by team visits and house marking, Egypt PCM, April 2014

	No.		% of total sample
1. Team did not visit house	1,287		8.3
2. Team visited house	14,290		91.7
2.1 House not marked	1,694	[11.9% of visited houses]	10.9
2.2 House marked	12,596	[88.1% of visited houses]	80.9
2.2.1 incorrectly marked	943	[7.5% of marked houses]	6.1
2.2.2 correctly marked	1,1653	[92.5% of marked houses]	74.8
Total	15,577		100.0

CAMPAIGN COVERAGE

The overall national vaccination coverage (family recall and finger-marking) was 97%, and finger-marking coverage was 86%. Having a finger mark present is the most definitive indicator that a child received polio vaccination during the campaign. There was no difference in vaccination coverage between infants and children 1-<5years (table 2). For detailed information on coverage please see table 5 in the Annexes. The market sample for infants in Giza, Alexandria and Cairo had a rather lower rate of coverage. Figure 1 shows the 6 districts with coverage less than 90%. Two of these districts had coverage less than 80% namely Halayeb (Red Sea), and Nasr East (Cairo). Vaccination coverage varied among different governorates, ranging from 90% to 100% by family recall (figure 2).

Table 2: Vaccination coverage by recall and finger-marking

	No.	%
Infants below one year	**11,911**	
vaccinated with finger-marking	10,163	85.3
vaccinated by family-recall	1,362	11.4
not vaccinated	386	3.2
children from 1 to 5 years	**34,824**	
vaccinated with finger-marking	30,243	86.8
vaccinated by family-recall	3,576	10.3
not vaccinated	1,005	2.9
Total ≤5	**46,735**	
vaccinated with finger-marking	40,406	86.46
vaccinated by family-recall	4,938	10.57
not vaccinated	1,391	2.98

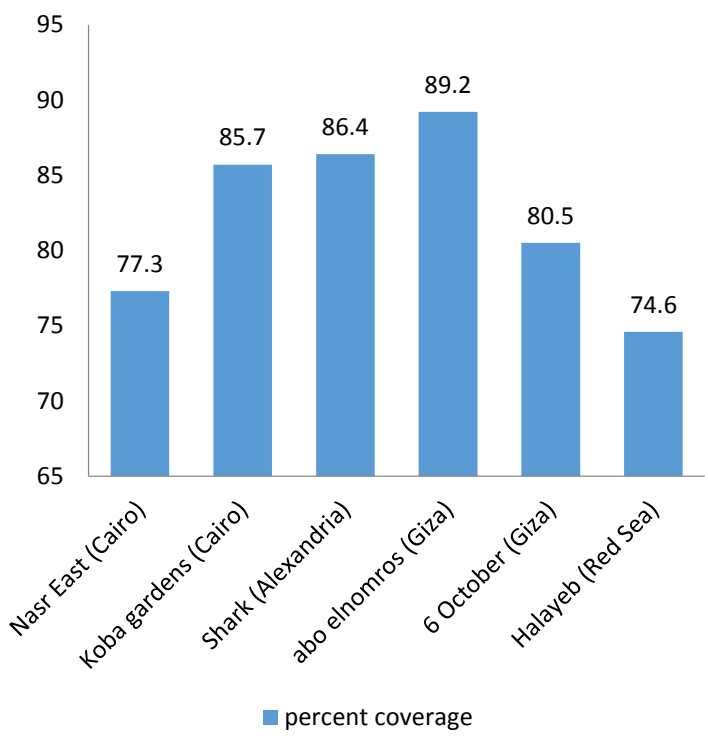

Figure 1: Districts with PCM coverage less than 90%

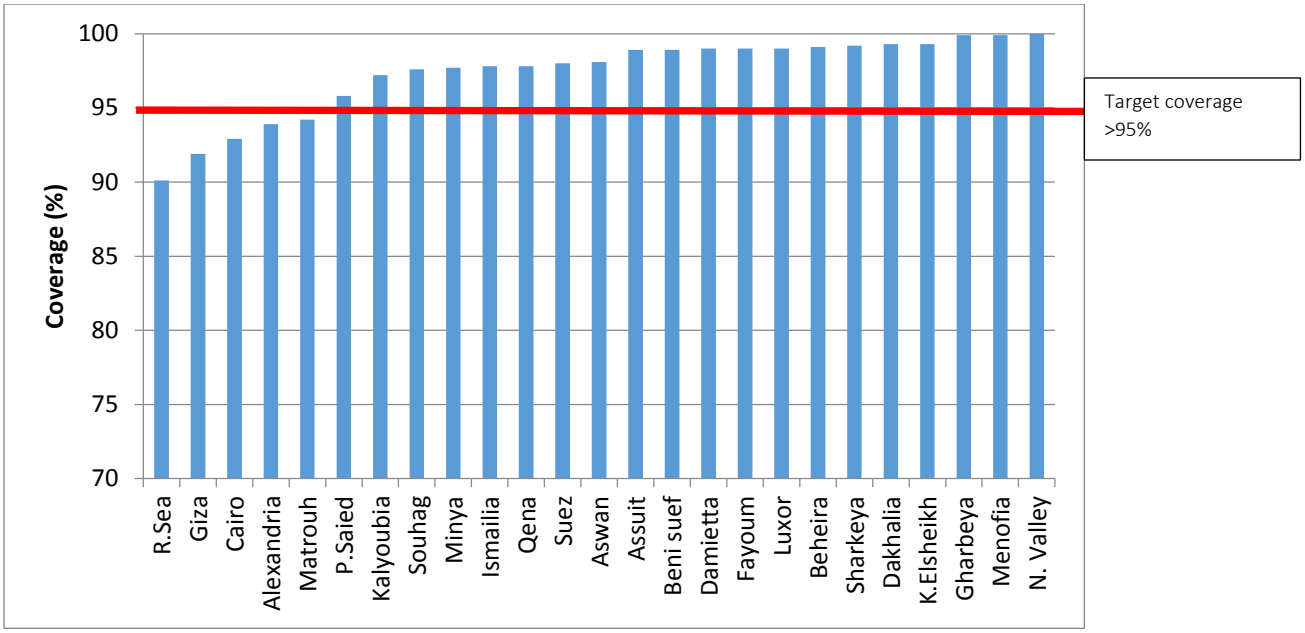

Figure 2: Governorates PCM vaccination coverage by family recall, Egypt PCM, April 2014

REASONS FOR NOT BEING VACCINATED

Overall, only 1,050 (3.7%) of 28,707 children included in the PCM survey were not vaccinated. The most common reasons for not being vaccinated included "absence of the child during the campaign" (42.2%), "vaccinator didn't reach their home" (31.2%) (Figure 3). In 10% of cases where a child was not vaccinated (78 children), the family refused the vaccination, most commonly because the child was sick (27 children, or 41.5%) or because of a perception that the vaccine was dangerous (20 children, or about 30.8%) and 16.9% believed it has no benefit, while in 4.6% the mother believed she can't take this decision.

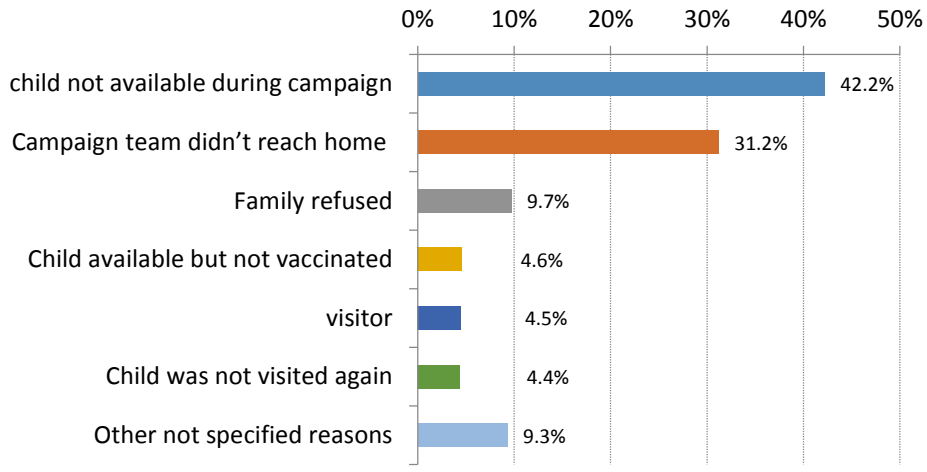

Figure 3: Reason for not being vaccinated during the campaign, Egypt PCM, April 2014

AWARENESS AND SOURCES OF KNOWLEDGE ABOUT THE CAMPAIGN

24,868 parents (86.6%), heard about the campaign before vaccination. Almost half of them (47.3%) heard about it from the television, while 34% heard about it from the health office, followed by other sources mentioned in table 3.

Table 3: Sources of household information about polio campaign

Source of information	No. (n=24868)	%
Television	11,359	47.3%
Health office	8,150	33.9%
Microphone announcement in village/city	3,555	14.8%
Community leaders , mosque/ church	2,528	10.5%
Neighbours	2,324	9.7%
Radio	838	3.5%
NGOs	221	0.9%

DISCUSSIONS and RECOMMENDATIONS

Whilst Egypt remains polio-free, vigilance should be maintained due to the recent cases of wild poliovirus in the region-- Iraq (07-Apr-14), Somalia (03-Jun-14), and Pakistan (09-Jul-14). Furthermore, the low finger-marking coverage in the same districts that had a recent positive environmental samples and ongoing measles outbreak, a proxy indicator of low routine immunization coverage, might led to "islands of low immunity" in the midst of high national vaccination coverage. The pockets of unimmunized children in districts with low routine immunization poses high risk for polio transmission in case of new importation for endemic or outbreak countries. MOH and international partners should prioritize these high districts with high quality targeted SIAs to close the potential immunity gaps and introduce the recommended bivalent oral polio vaccine (bOPV) and inactivated polio vaccine (IPV).

The polio program in Egypt should continue conducting PCM after every SIAs to ensure the quality of the campaign. The country program should consider introducing intra-campaign monitoring in order take immediate corrective action during the campaign days.

Training for campaign monitors should emphasise the importance of identifying reasons for non-vaccination in order to appropriately respond to any concerns and strengthen future campaigns.

Finger marking is the only way to assess the coverage with high confidence during immunization campaigns and the preferred method for assessing immunization coverage. Vaccinators and supervisors should be trained on the significance of finger marking. Further analysis should be conducted to determine the reasons for low finger marking.

More efforts are required to cover the defects in the low coverage districts and tackle the reasons of these defects. This could happen by categorizing reasons for un-vaccination and developing innovative ways to address these problems and interventions. This should be included in training of teams and supervisors as well as monitors.

Activities to raise awareness of the campaigns using multiple communication strategies, particularly in high risk areas, should be conducted to improve compliance with vaccination. The overall social mobilization and communication strategy must be reviewed carefully and improvements made.

CONCLUSIONS

Egypt has successfully conducted the first comprehensive post-campaign monitoring exercise in April 2014.

1. The overall coverage of April 2014 National Immunization days is high.
    a. 97% of the <5 children included in the PCM were vaccinated against polio
    b. 86% of the total number of children had evidence of vaccination by finger marking
2. All governorates included in the post-campaign monitoring had polio immunization coverage rates of over 90% and 19 out of 25 governorates had coverage rates of over 95%.
    a. The lowest immunization coverage was in Cairo and Giza Governorates, the lowest covered areas were the same areas with positive environmental samples in 2012.
    b. Low coverage was also observed in Red Sea Governorate due to some traditional and political issues.
3. However, there are some high risk districts were the coverage fall below or around 80%, and with coverage between 80 and 90%.
4. Nearly one third of the missed children were due to underperformance of vaccination teams in reaching households.
5. The overall awareness of the campaign was high through the combined efforts of different communication channels.

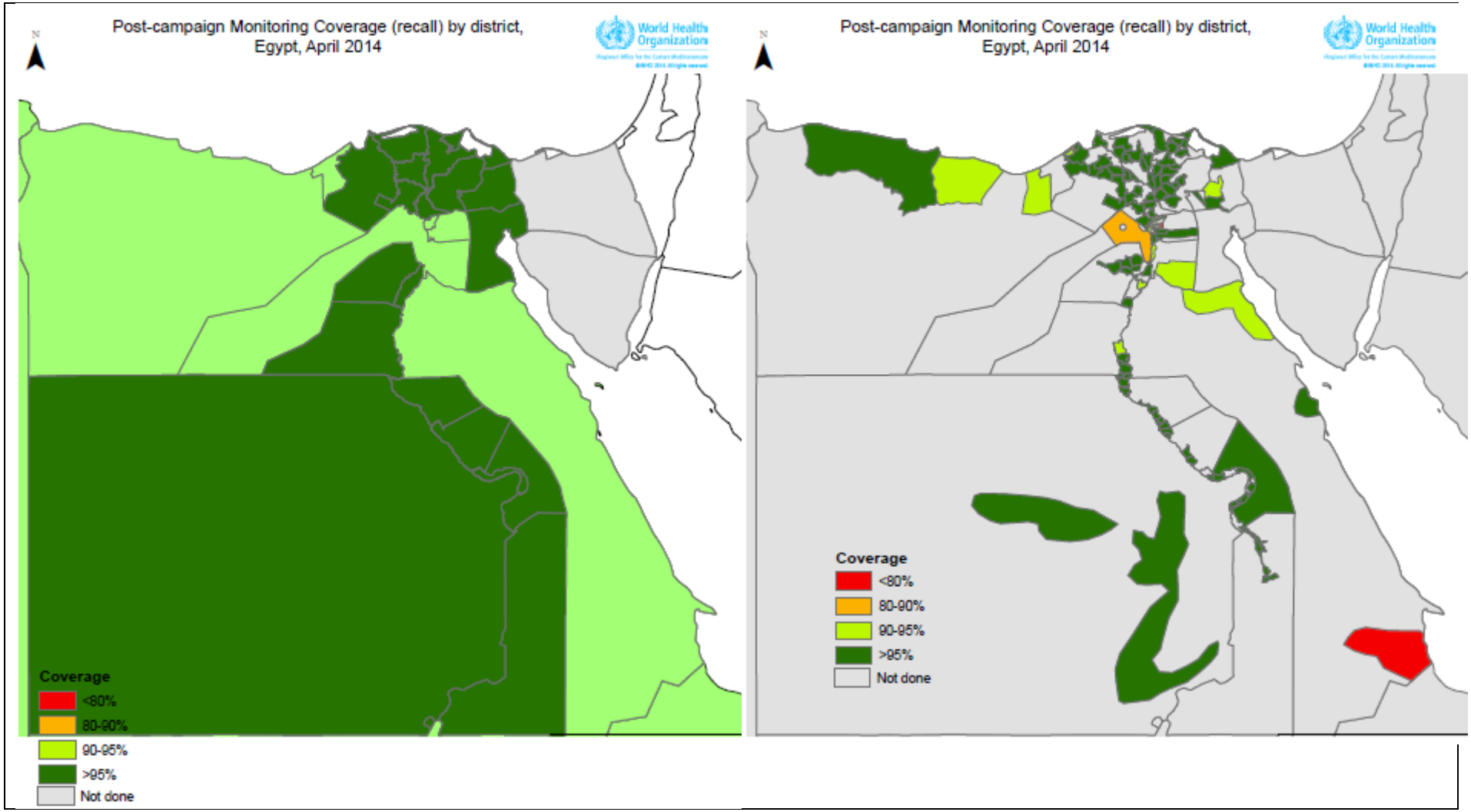

Figure 1: Post-campaign monitoring coverage by recall at governorate and district level, Egypt, April 2014

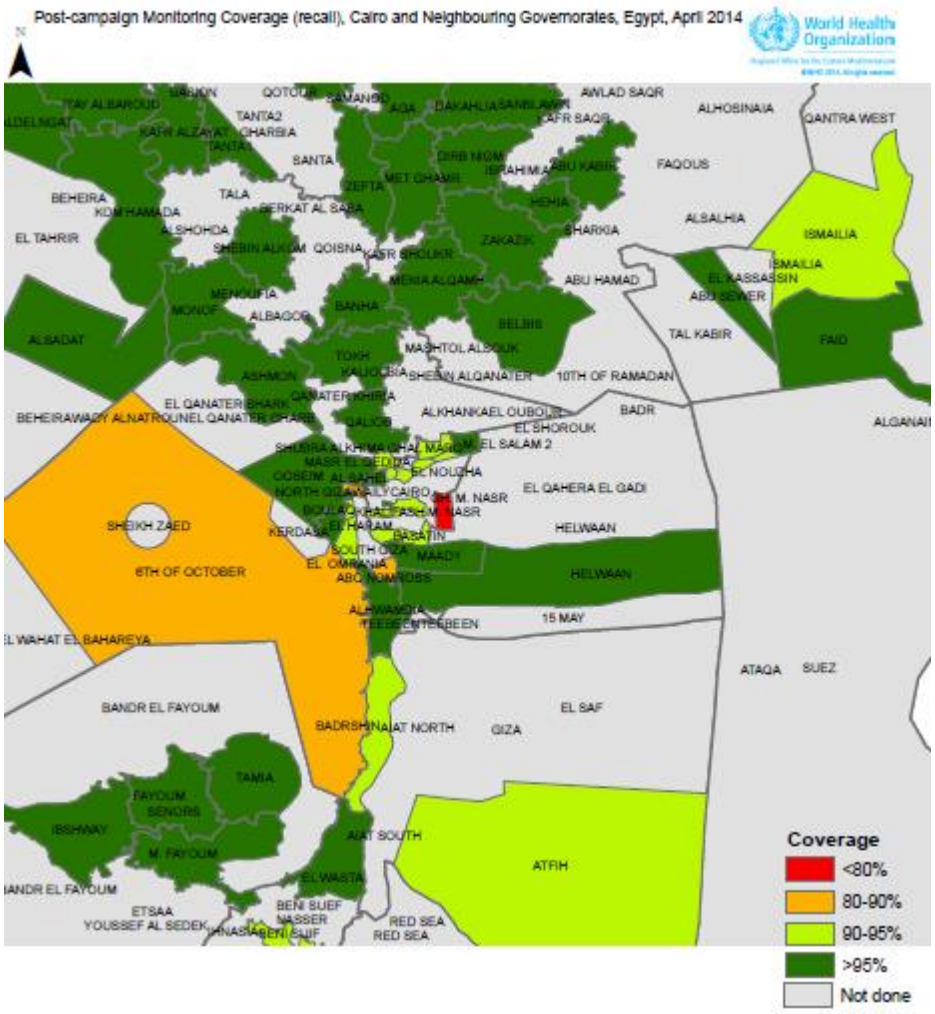

Figure 2: Post-campaign monitoring coverage by recall in Cairo and Neighbouring Governorates, Egypt, April 2014

Table 1: Distribution of the interviewees by Governorates, number of districts and number of health offices

	Governorate	Place of interview				Total
		household			market	
		Districts	Health offices	families	families	families
Urban	Cairo	17	49	2041	2050	4091
	Alexandria	4	12	479	480	959
	Portsaid	3	3	120	120	240
	Suez	2	6	390	120	510
Upper Egypt	Giza	11	29	1390	1390	2780
	Beni Suef	4	4	490	420	910
	Fayoum	4	9	500	440	940
	Minya	4	11	480	480	960
	Assuit	6	13	679	690	1369
	Souhag	5	15	600	640	1240
	Qena	4	12	480	340	820
	Aswan	3	9	360	230	590
	Luxor	4	8	380	190	570
Lower Egypt	Damietta	3	13	380	340	720
	Dakahlia	9	27	1059	980	2039
	Sharkia	6	18	800	580	1380
	Kalubia	4	11	469	480	949
	KafrelSheikh	5	15	610	600	1210
	Gharbeya	5	15	710	370	1080
	Menoufia	4	12	480	440	920
	Behira	8	24	1030	820	1850
	Ismailia	5	9	390	290	680
Frontier	Red Sea	3	7	620	130	750
	New Valley	2	6	240	190	430
	Matrouh	3	13	400	320	720
Total				15577	13130	28707

Table 2: Distribution of surveyed children by age and governorate

Total Data		Source of data: home			market			Total		
		infants below one year	children from 1 to 5 years	Number of children	infants below one year	children from 1 to 5 years	Number of children	infants below one year	children from 1 to 5 years	Number of children
Urban	Cairo	625	2120	2745	588	2095	2683	1213	4215	5428
	Alexandria	120	469	589	110	440	550	230	909	1139
	Portsaid	74	129	203	37	138	175	111	267	378
	Suez	146	471	617	40	131	171	186	602	788
	Total	965	3189	4154	775	2804	3579	1740	5993	7733
Upper Egypt	Giza	436	1629	2065	457	1648	2105	893	3277	4170
	Beni Suef	235	668	903	178	524	702	413	1192	1605
	Fayoum	280	601	881	197	498	695	477	1099	1576
	Minya	170	628	798	170	559	729	340	1187	1527
	Assuit	373	1018	1391	371	929	1300	744	1947	2691
	Souhag	335	902	1237	376	687	1063	711	1589	2300
	Qena	278	549	827	207	447	654	485	996	1481
	Aswan	168	446	614	104	259	363	272	705	977
	Luxor	146	451	597	83	246	329	229	697	926
	Total	2421	6892	9313	2143	5797	7940	4564	12689	17253
Lower Egypt	Damietta	199	676	875	134	239	373	333	915	1248
	Dakahlia	539	1376	1915	313	1119	1432	852	2495	3347
	Sharkia	297	1012	1309	184	584	768	481	1596	2077
	Kalubia	138	553	691	189	500	689	327	1053	1380
	KafrelSheikh	243	802	1045	165	737	902	408	1539	1947
	Gharbeya	412	927	1339	178	534	712	590	1461	2051
	Menoufia	208	674	882	364	724	1088	572	1398	1970
	Behira	419	1533	1952	275	991	1266	694	2524	3218
	Ismailia	155	592	747	79	358	437	234	950	1184
	Total	2610	8145	10755	1881	5786	7667	4491	13931	18422
Frontier	Red Sea	328	529	857	86	97	183	414	626	1040
	New Valley	154	285	439	150	209	359	304	494	798
	Matrouh	253	601	854	145	490	635	398	1091	1489
	Total	735	1415	2150	381	796	1177	1116	2211	3327
Total		**6731**	**19641**	**26372**	**5180**	**15183**	**20363**	**11911**	**34824**	**46735**

Table 3: Reasons mentioned for non-vaccination

		Reasons for non-vaccination					
		Child not available during campaign	Family refused	Campaign team didn't reach home	Child was not visited again	visitor	Child available but not vaccinated
Urban	Cairo	39.1%	10.2%	26.6%	2.6%	5.5%	4.7%
	Alexandria	29.4%	7.8%	17.6%	7.8%	9.8%	2.0%
	Suez	62.5%	25.0%	12.5%	.0%	.0%	.0%
	Portsaid	40.0%	.0%	40.0%	40.0%	.0%	20.0%
Upper Egypt	Giza	51.8%	9.2%	31.2%	3.5%	.7%	12.1%
	Luxor	75.0%	.0%	25.0%	.0%	.0%	.0%
	Qena	50.0%	12.5%	25.0%	.0%	6.2%	.0%
	Fayoum	100.0%	.0%	.0%	.0%	.0%	.0%
	Aswan	58.8%	11.8%	23.5%	.0%	5.9%	.0%
	Assuit	44.4%	16.7%	33.3%	22.2%	5.6%	.0%
	Souhag	52.8%	11.1%	22.2%	5.6%	.0%	.0%
	Minya	91.7%	4.2%	.0%	.0%	4.2%	.0%
	Beni Suef	18.2%	27.3%	.0%	27.3%	27.3%	9.1%
Lower Egypt	Kalubia	47.8%	13.0%	8.7%	.0%	8.7%	4.3%
	Damietta	25.0%	.0%	50.0%	.0%	25.0%	.0%
	Ismailia	45.0%	5.0%	45.0%	25.0%	.0%	10.0%
	Gharbeya	50.0%	50.0%	.0%	.0%	.0%	.0%
	KafrelSheikh	30.0%	10.0%	30.0%	.0%	10.0%	.0%
	Behira	61.1%	5.6%	33.3%	5.6%	.0%	.0%
	Sharkia	60.0%	10.0%	10.0%	10.0%	10.0%	.0%
	Dakahlia	41.7%	.0%	41.7%	8.3%	.0%	8.3%
Frontier	Matrouh	46.2%	15.4%	30.8%		7.7%	
	Red Sea	5.6%	5.6%	87.5%		1.4%	

% from the reasons mentioned within each governorate

Table 4: Sources of household information about polio campaign by governorate

		Source of information about campaign						
		Television	Health office	Microphone announcement in village/city	Community leaders , mosque/ church	Neighbours	Radio	NGOs
Urban	Cairo	2.9%	29.8%	6.2%	9.8%	7.6%	64.7%	.8%
	Alexandria	.5%	34.2%	8.3%	10.7%	11.1%	52.3%	4.1%
	Suez	1.4%	25.9%	1.2%	36.5%	4.1%	32.9%	.0%
	Portsaid	.9%	8.7%	1.7%	16.5%	15.2%	59.7%	.0%
Upper Egypt	Giza	1.0%	14.9%	7.1%	10.0%	8.1%	66.4%	.3%
	Luxor	3.3%	5.7%	12.0%	51.2%	10.0%	58.2%	.2%
	Qena	3.7%	10.2%	15.1%	54.5%	18.7%	47.0%	1.8%
	Fayoum	.5%	13.3%	5.0%	68.4%	7.0%	24.9%	.0%
	Aswan	7.2%	11.7%	20.3%	40.1%	15.5%	54.7%	.2%
	Assuit	5.4%	9.3%	9.7%	49.5%	10.4%	27.8%	.3%
	Souhag	.8%	12.3%	9.1%	41.6%	10.4%	32.8%	.9%
	Minya	.0%	4.6%	18.0%	57.1%	4.0%	23.6%	.4%
	Beni Suef	1.0%	5.5%	17.2%	62.8%	7.0%	26.9%	.6%
Lower Egypt	Kalubia	2.7%	7.7%	3.9%	22.2%	11.0%	58.0%	.0%
	Damietta	.5%	13.1%	4.7%	19.3%	10.4%	55.8%	.0%
	Ismailia	1.6%	4.3%	3.2%	18.7%	10.1%	68.3%	.0%
	Gharbeya	7.9%	34.7%	36.9%	56.5%	19.4%	33.6%	4.4%
	KafrelSheikh	8.2%	4.7%	24.7%	35.6%	5.7%	43.4%	2.4%
	Behira	2.8%	4.9%	8.2%	37.0%	13.0%	41.6%	1.0%
	Sharkia	1.7%	10.2%	1.1%	20.0%	6.0%	62.9%	1.6%
	Menoufia	.7%	16.9%	17.9%	23.9%	5.4%	37.8%	.1%
	Dakahlia	1.5%	7.0%	15.0%	47.6%	5.5%	41.6%	.6%
Frontier	Matrouh	6.5%	27.6%	7.6%	70.5%	23.1%	34.1%	.9%
	Red Sea	.0%	.4%	.0%	55.8%	19.8%	28.5%	.0%
	New Valley	55.7%	12.7%	6.4%	35.7%	8.8%	61.6%	.2%

% from the sources mentioned within each governorate

Table 5: Vaccination coverage by age, site, and governorate

		House-to-house									Out-of-house (market survey)									Total								
		infants <1y			children 1-5y			Total ≤5			infants <1y			children 1-5y			Total ≤5			infants <1y			children 1-5y			Total ≤5		
	Governorate	finger-marking	Family-recall	not vaccinated	finger-marking	Family-recall	not vaccinated	finger-marking	Family-recall	Non vaccinated	finger-marking	Family-recall	not vaccinated	finger-marking	Family-recall	not vaccinated	finger-marking	Family-recall	Non vaccinated	finger-marking	Family-recall	not vaccinated	finger-marking	Family-recall	not vaccinated	finger-marking	Family-recall	not vaccinated
Urban	Cairo	64	29	7	72	22	7	70	23	7	69	21	**10**	76	17	7	74	18	8	66	25	9	74	19	7	72	21	7.1
	Alexandria	75	23	2	78	16	6	78	18	5	71	18	**11**	79	15	6	78	15	7	73	21	6	79	15	6	78	16	6.1
	Portsaid	68	24	8	79	16	5	75	19	6	92	5	3	88	10	2	89	9	2	76	18	6	84	13	3	81	15	4.2
	Suez	87	10	3	94	4	2	92	6	2	100	0	0	97	1	2	98	1	2	90	8	2	95	4	2	93	5	2
	Total	69	25	6	77	18	6	75	20	6	72	19	9	78	16	6	77	16	7	70	23	7	77	17	6	76	18	6.3
Upper Egypt	Giza	74	17	9	80	14	6	79	14	7	67	21	**12**	72	19	9	71	19	**10**	70	19	**11**	76	16	7	75	17	8.1
	Beni Suef	77	22	0	83	16	1	82	17	1	86	12	2	88	12	1	87	12	1	81	18	1	85	14	1	84	15	1.1
	Fayoum	90	9	1	85	14	2	86	12	2	95	5	0	90	10	0	91	9	0	92	7	1	87	12	1	89	11	1
	Minya	89	8	3	89	10	1	89	10	1	79	15	7	87	11	2	85	12	3	84	12	5	88	10	2	87	11	2.3
	Assuit	93	6	1	91	8	1	92	7	1	90	9	1	85	14	1	86	13	1	91	8	1	88	11	1	89	10	1.1
	Souhag	87	12	2	90	6	3	89	8	3	96	2	3	92	6	1	94	5	2	91	6	2	91	6	3	91	6	2.4
	Qena	84	14	2	87	10	4	86	11	3	90	9	1	91	8	1	91	8	1	87	12	2	89	9	2	88	10	2.2
	Aswan	96	3	1	98	2	1	97	2	1	93	4	3	94	2	4	94	2	4	95	3	2	97	2	2	96	2	1.9
	Luxor	97	3	0	95	4	1	96	4	1	98	0	2	98	1	1	98	1	2	97	2	1	96	3	1	96	3	1
	Total	86	11	3	87	10	3	87	10	3	86	10	4	85	12	4	85	11	4	86	11	4	86	11	3	86	11	3.2
Lower Egypt	Damietta	98	3	0	99	1	0	98	1	0	96	4	1	92	4	4	93	4	3	97	3	0	97	2	1	97	2	1
	Dakahlia	97	3	1	98	1	1	98	2	1	96	2	2	98	2	0	97	2	1	96	3	1	98	2	1	98	2	0.7
	Sharkia	97	2	2	98	2	0	98	2	1	97	1	2	99	0	1	99	1	1	97	2	2	98	1	1	98	1	0.8
	Kalubia	97	2	1	96	1	3	97	1	2	86	11	3	93	4	3	91	6	3	91	7	2	95	2	3	94	3	2.8
	KafrelSheikh	98	2	0	99	1	1	99	1	0	98	1	1	98	1	1	98	1	1	98	2	0	98	1	1	98	1	0.7
	Gharbeya	73	27	1	80	20	0	78	22	0	89	11	0	85	15	0	86	14	0	78	22	0	82	18	0	81	19	0.1
	Menoufia	96	4	0	94	6	0	95	5	0	96	4	0	96	4	0	96	4	0	96	4	0	95	5	0	95	5	0.1
	Behira	95	5	0	94	6	1	94	6	1	95	4	1	97	2	1	97	2	1	95	5	0	95	4	1	95	4	0.9
	Ismailia	94	7	0	93	6	1	93	6	1	79	14	8	85	12	4	84	12	5	89	9	3	90	8	2	90	8	2.2
	Total	93	7	1	95	5	1	94	5	1	94	5	1	95	4	1	95	4	1	93	6	1	95	5	1	94	5	0.9
Frontier	Red Sea	73	20	7	56	30	**14**	62	26	**11**	98	0	2	97	0	3	97	0	3	78	16	6	62	25	**12**	69	22	9.9
	New Valley	100	0	0	100	0	0	100	0	0	100	0	0	100	0	0	100	0	0	100	0	0	100	0	0	100	0	0
	Matrouh	57	34	9	59	37	4	59	36	6	52	41	7	58	36	6	56	38	6	55	36	8	58	37	5	58	37	5.8
	Total	73	21	6	66	27	7	69	25	7	81	16	3	74	22	4	76	20	4	76	19	5	69	25	6	71	23	5.7
Total		**85**	**13**	**3**	**87**	**10**	**3**	**86**	**11**	**3**	**86**	**10**	**4**	**87**	**10**	**3**	**87**	**10**	**3**	**85**			**87**	**10**	**3**	**87**	**11**	**3**