

# Ten Years of Certified "Polio-Free" Status in Greece : 2002 – 2012

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## Introduction

Greece was certified "polio-free", with the WHO European region countries, in 2002. The last case of poliomyelitis due to indigenous wild poliovirus occurred in Greece in 1996. From 1996-2002, 4 Vaccine Associated Paralytic Poliomyelitis (VAPP) cases were reported. Despite the problem of poliomyelitis is not a priority in polio-free countries, it is important to guarantee a high quality surveillance as there is a risk of importation of cases from areas where the disease is endemic.

Acute Flaccid Paralysis (AFP) surveillance is the gold standard for the polio eradication initiative. Stopping poliovirus transmission is pursued through a combination of high infant immunization coverage and surveillance for wild poliovirus through reporting and laboratory testing of all AFP cases among children under 15 years of age.



## Methods

To achieve and maintain the certification, following WHO's guidelines, intensive active AFP surveillance has been set up on a weekly basis in Greece, since 1998 by the Department of Epidemiological Surveillance and Intervention of the Hellenic Centre for Disease Control and Prevention (H.C.D.C.P.), by establishing a national hospital network. The network involves 25 hospitals (52 HCPs: neurologists, pediatricians, ICU doctors). All AFP cases are investigated clinically, epidemiologically and laboratory. For laboratory testing, the collection of two faecal samples, taken 24 hours apart and within 14 days from the onset of paralysis, is requested and the samples are sent to the Hellenic National Polio Reference Laboratory – Hellenic Pasteur Institute. After chloroform treatment, specimens are inoculated simultaneously into L20B and RD cell lines followed by microscopic observation for up to 5 days, according to the standard WHO protocol. Cultures showing no cytopathogenic effects (CPE) are recorded as negative. In the case of a positive result, typing of polio and non-polio isolates is performed by seroneutralization using specific antisera.

In addition, an Environmental Poliovirus Surveillance (ENV) of sewage specimens for polioviruses/ enteroviruses as well as a polioviruses/ enteroviruses stool study were adopted by H.C.D.C.P. according to WHO's Strategic Plan of Global Polio Eradication Initiative. These supplementary tools to AFP surveillance were implemented in selected areas of Greece, where high risk populations with low vaccination coverage (immigrants, refugees, Romas) reside. Samples are tested for polioviruses/ enteroviruses by Hellenic Pasteur Institute, using the "two-phase" concentration method in accordance with the standards recommended by WHO.



Table 1: Quality Surveillance indicators of AFP, Greece 2002 – 2012.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nr AFP cases <15 y.o. <b>TOTAL : 185</b>	<b>15</b>	<b>13</b>	<b>11</b>	<b>19</b>	<b>19</b>	<b>15</b>	<b>16</b>	<b>16</b>	<b>20</b>	<b>24</b>	<b>17</b>
Nr of confirmed polio cases	0	0	0	0	0	0	0	0	0	0	0
Annualized non-polio AFP rate <15y	0.86	0.80	0.68	1.18	1.18	0.93	0.98	1.03	1.21	1.43	1.01
% AFP with 2 faecal specimens within 14d, >1d apart	40.0	30.7	45.4	36.8	73.6	66.6	87.5	68.7	40.0	79.2	88.2
% AFP with 1 faecal specimen within 14d	46.6	38.5	54.5	57.9	73.7	66.7	87.5	68.7	60.0	91.7	94.1
% AFP cases with delay between onset & notification < 7d	6.6	7.7	90.9	78.9	100	100	93.7	87.5	70.0	87.5	100
% AFP cases with delay between notification & investigation < 2d	86.6	100	100	100	100	100	100	100	100	100	100
% AFP cases with DFUP 60 to 90d after onset	66.6	69.2	54.5	57.8	89.5	86.6	62.5	93.7	100	100	100
AFP cases with less than 3 IPV/OPV doses	2	0	0	0	3	2	1	2	1	1	0

## Results

From 2002 to 2012, in total, 185 AFP cases (11 – 24 per year) were reported. No wild polioviruses or vaccine associated paralytic poliomyelitis case was identified. Based on the population 0-15 years old which ranged from 1,627,644 in 2002 to 1,684,814 in 2012, the number of expected AFP cases was 17 cases per year. Annual incidence ranged from 0.68 to 1.43 per 100,000 population. Guillain-Barré syndrome was the most prevalent definite diagnosis. AFP cases percentage with 2 faecal specimens (within 14 days from onset, <1 day apart) ranged from 40.0 to 88.2%. All faecal specimens analyzed by the National Polio Reference Laboratory – Hellenic Pasteur Institute were negative for polioviruses. Follow-up (60-90 days after onset) ranged from 54.5 to 100%. (Table 1)

From November 2010 to December 2012, 223 stool samples from Roma children (<15 years old) were collected. All specimens analysed by the Hellenic National Polio Reference Laboratory – Hellenic Pasteur Institute were negative for polioviruses, though, 31.8% of stool specimens were positive for NPEV.

In the period from January 2012 to May 2013, a total of 141 samples from sewage disposal systems were collected all of which were tested for polioviruses/ enteroviruses. No wild or vaccine-derived polioviruses were isolated. However, non-polio enteroviruses (NPEV) were detected in 22% of the samples. (Table 2)

Table 2: Sewage samples (Jan 2012 - May 2013) & stool samples (Nov 2010 – Dec 2012) collected per administrative area.

Administrative areas	No of sewage samples	Positive sewage samples with NPEV isolates	Isolated NPEV serotypes in sewage samples	No of stool samples from Roma children (<15 y.o.)	Positive stool samples with NPEV isolates	Isolated NPEV serotypes in stool samples
Eastern Macedonia & Thrace	22	4 (18.2%)	Coxsackie B3 (3%) Coxsackie B4 (6%) Coxsackie B5 (3%) ECHO 6 (13%) ECHO 7 (16%) ECHO 11 (39%) ECHO 13 (3%)	100	27 (27.0%)	Coxsackie A Coxsackie A13 Coxsackie A16 Coxsackie A2 Coxsackie A21 Coxsackie A24 Coxsackie A4 Coxsackie A5 Coxsackie A9 Coxsackie B4 ECHO 6 ECHO 7 ECHO 11 ECHO 14 ECHO 25 ECHO 30 Enterovirus 82 Enterovirus 99
Central Macedonia	24	10 (41.6%)		61	12 (19.7%)	
Western Macedonia	-	-		-	-	
Thessaly	18	2 (11.1%)		34	12 (35.3%)	
Ipiros	5	0 (0%)		-	-	
Western Greece & Ionian Islands	-	-		17	14 (82.3%)	
Stereia Ellada	-	-		-	-	
Peloponnisos	53	12 (22.6%)		-	-	
Attiki	1	0 (0%)		11	6 (54.5%)	
Northern Aegean	-	-		-	-	
Southern Aegean	8	3 (37.5%)		-	-	
Creta	10	0 (0%)		-	-	
<b>TOTAL</b>	<b>141</b>	<b>31 (22.0%)</b>		<b>223</b>	<b>71 (31.8%)</b>	

## Conclusions

Sustained systematic and high quality AFP, stool and environmental surveillance for polioviruses combined with high immunization coverage of the general population as well as specific subpopulation groups are increasingly important for Greece to retain its "polio-free" status and minimize the risk and consequences of polio re-introduction by immigrants from endemic countries.

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