

# Middle East Consortium on Infectious Diseases Surveillance

## MECIDS

### Regional Technical Report 2005-2010



**2010**



Middle East Consortium on  
Infectious Disease Surveillance

## Abbreviations

CDC	Center of Diseases Control
CMC	Cooperative Monitoring Center
MESIS	Middle East Scientific Institute For Security
MECIDS	Middle East Consortium on Infectious Diseases Surveillance
NPHL	National Public Health Laboratory
r	Pearson product-moment correlation coefficient, a measure of correlations between two variables, its value vary from +1 and -1 used as a measure of the strength of linear dependence between two variables.
$r^2$	Square of the sample correlation coefficient it is used for prediction of future outcomes. It is the proportion of variability in a data set that is accounted for, by the statistical model, its values vary from 0 - 1
Human specimens	Source of specimens from blood of patients or stool from patients or food handlers
Non human specimens	Source of specimens from food items, drinking water or waste water

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## Introduction

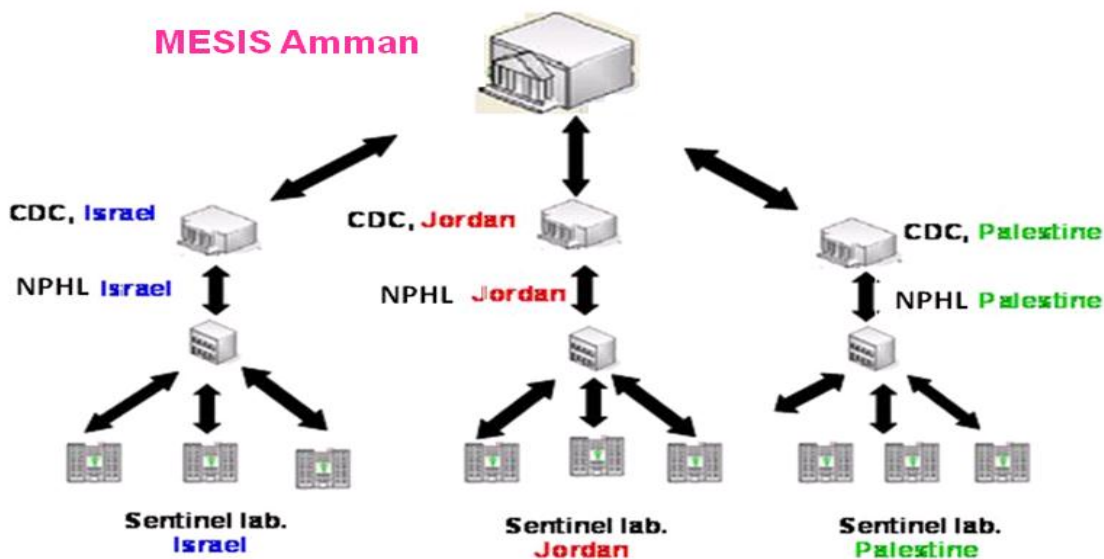
The Middle East Consortium on Infectious Disease Surveillance (MECIDS) continued its local and regional activities throughout 2010 to achieve its mission “to improve the regional laboratory-based surveillance network on food-borne diseases”; Six years of a hard work passing all obstacles although of the oscillating of the political situation and despite of the instability of political situation in the region.

The ongoing data collection on Salmonella for regional laboratory-based surveillance network on foodborne diseases works regularly on monthly base; local data were sent to Regional Data Analysis Unit at the Middle East Scientific Institute For Security "MESIS" Amman Jordan, formally Cooperative Monitoring Center (CMC); data was checked for errors, tabulated in a specific format to create a database, then was plotted on a regional server to be shared between the partners.

The data was analyzed and compared; a consolidated regional report was written.

Data collection started in July 2005, the following diagram illustrate the data flow chart

Data flow chart



## Regional Data analysis (2005-2010)

The cumulative number of specimens which were tested from the beginning of the project activities (July, 2005), until 31<sup>st</sup>, December 2010, from all three partners were 566397 specimens, yielded 6776 isolates, Salmonella isolates were divided according to the source of specimens into human which yielded 6162 isolates and non human which yielded 614 isolates.

**Table 1; Distribution of tested Specimens and isolates by source of specimens, year and MECIDS partners**

Source of Specimens	Country	Description	2005	2006	2007	2008	2009	2010	Total
Human	Israel	Specimens	70272	69689	42617	39209	33586	35483	290856
		Isolates	773	986	885	924	951	1048	5567
		Isolationrate/1000	11	14	21	24	28	30	19
	Jordan	Specimens	5000	11599	13174	13102	13759	13304	69938
		Isolates	53	93	90	51	35	58	380
		Isolationrate/1000	11	8	7	4	3	4	5
	Palestine	Specimens	12842	6921	302	343	143	152	20703
		Isolates	80	52	35	15	31	2	215
		Isolationrate/1000	6	8	116	44	217	13	10
	All Human	Specimens	88114	88209	56093	52654	47488	48939	381497
Isolates		906	1131	1010	990	1017	1108	6162	
Non Human specimens	Israel	Specimens	0	0	0	0	0	0	0
		Isolates	0	0	0	0	0	0	0
		Isolationrate/1000							
	Jordan	Specimens	9422	22290	24769	30050	33559	25990	146080
		Isolates	0	10	7	13	21	8	59
		Isolationrate/1000	0	0	0	0	1	0	0
	Palestine	Specimens	8807	5315	4685	5975	7483	6555	38820
		Isolates	113	77	91	100	106	68	555
		Isolationrate/1000	13	14	19	17	14	10	14
	All Non Human	Specimens	18229	27605	29454	36025	41042	32545	184900
Isolates		113	87	98	113	127	76	614	
All	MECIDS	Total Specimens	106343	115814	85547	88679	88530	81484	566397
		Total Isolates	1019	1218	1108	1103	1144	1184	6776
		Isolationrate/1000	10	11	13	12	13	15	12

*Data collection in Israel began on January 2005; the total Number of specimens from Israel does not include the number of food specimens*

*Data collection in Jordan began on July 2005*

*Data collection in Palestine began on January 2005; there is no data within the period August-December 2006*

Human specimens collected from patient's blood yielded 147 isolates; and from patients or food handlers stool yielded 6015 isolates.

Non human specimens collected from food items (Jordan), and water, waste water and swimming pools (Palestine) yielded 614 isolates; there weren't data concerning non human specimens from Israel

The following table illustrates the distribution of the Salmonella isolates by source of specimens, year and by MECIDS partners, table 2.

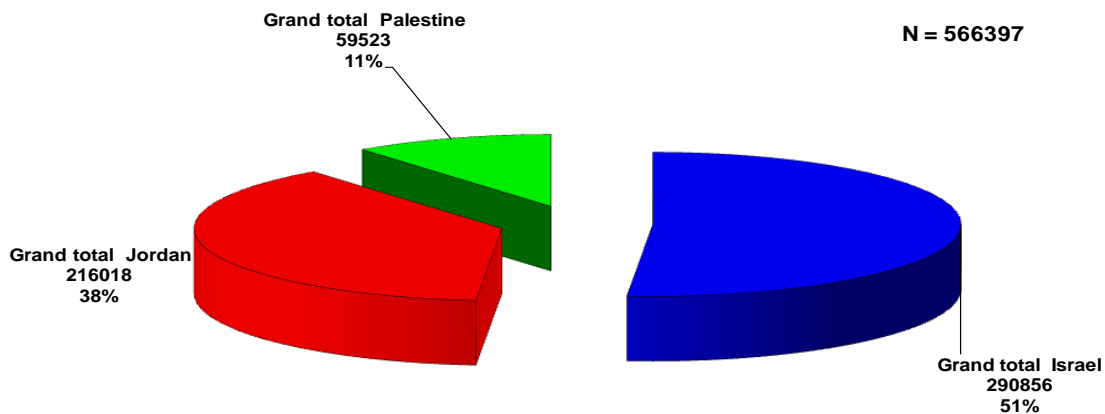
Table 2; Distribution of Salmonella isolates, by MECIDS partners, source of specimens and by year

years	Human								Non Human specimens				Grand Total
	Blood				Stool specimens*				Israel	Jordan	Palestine	Total	
	Israel	Jordan	Palestine	Total	Israel	Jordan	Palestine	Total					
2005	20	6	0	26	753	47	80	880	0	0	113	113	1019
2006	32	1	0	33	954	92	52	1098	0	10	77	87	1218
2007	15	3	0	18	870	87	35	992	0	7	91	98	1108
2008	24	0	0	24	900	51	15	966	0	13	100	113	1103
2009	31	1	0	32	920	34	31	985	0	21	106	127	1144
2010	13	1	0	14	1035	57	2	1094	0	8	68	76	1184
Total	135	12	0	147	5432	368	215	6015	0	59	555	614	6776

\* include other non stool non blood

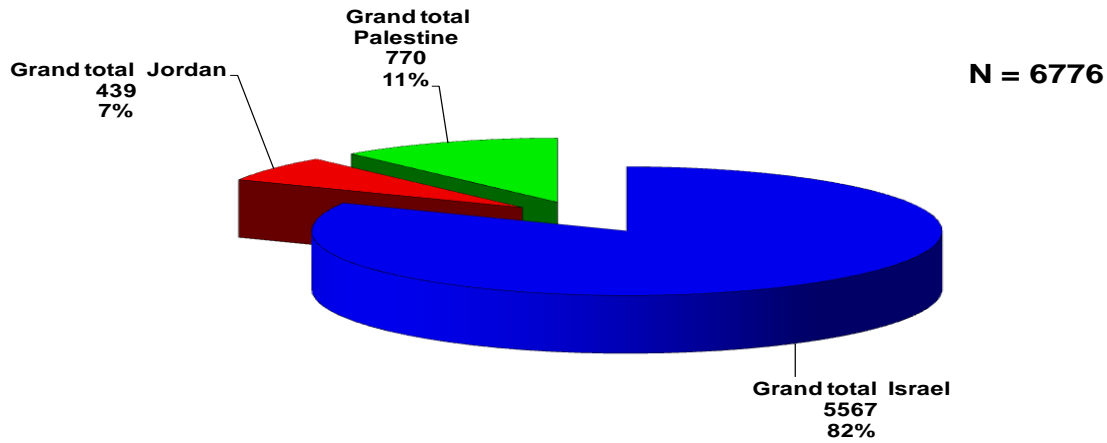
Of the total 566397 specimens which represents the cumulative number of tested specimens in the period 2005-2010 from MECIDS project partners; 290856 (51%) were from Israel yielded 5564 isolates, 216018 (38%) were from Jordan which yielded 439 isolates and 59523 (11%) from Palestine yielded 770 isolates figure. 1

Figure 1; Distribution of human and non human Salmonella Specimens 2005-2010 by MECIDS partners



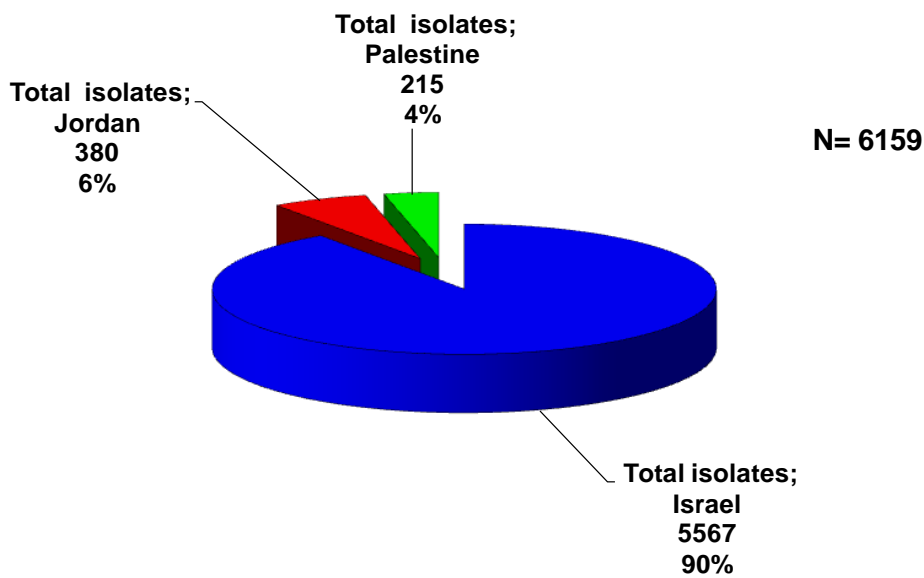
At the regional level 82% of isolates were from Israel, 11% of isolates were from Palestine and 7% of isolates were from Jordan figure 2.

**Figure 2; Distribution of human and non human Salmonella isolates, 2005-2010 by MECIDS partners**



Human source specimens which represent 381497 specimens for the period 2005-2010 yielded 6159 isolates; 90% of the yielded isolates were from Israel, 6% from Jordan and 4% from Palestine; figure 3.

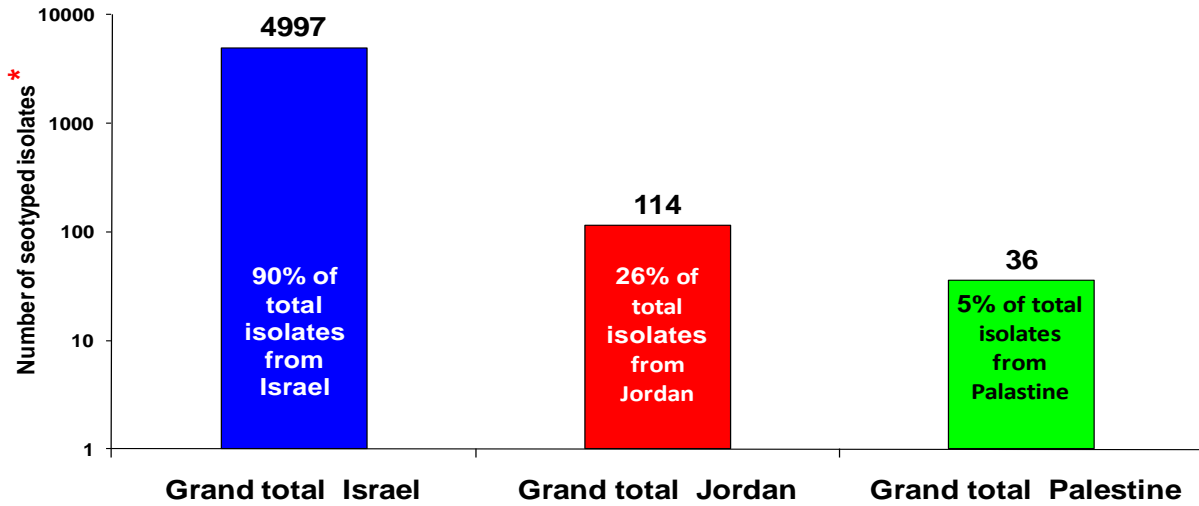
**Figure 3; Distribution of Salmonella isolates from human specimens, 2005-2010 by MECIDS partners**





90%, 26% and 5% of Salmonella isolates were serotyped from Israel, Jordan and Palestine respectively; figure 4.

**Figure 4; Distribution of Serotyped Salmonella isolates, 2005-2010 by MECIDS partners**

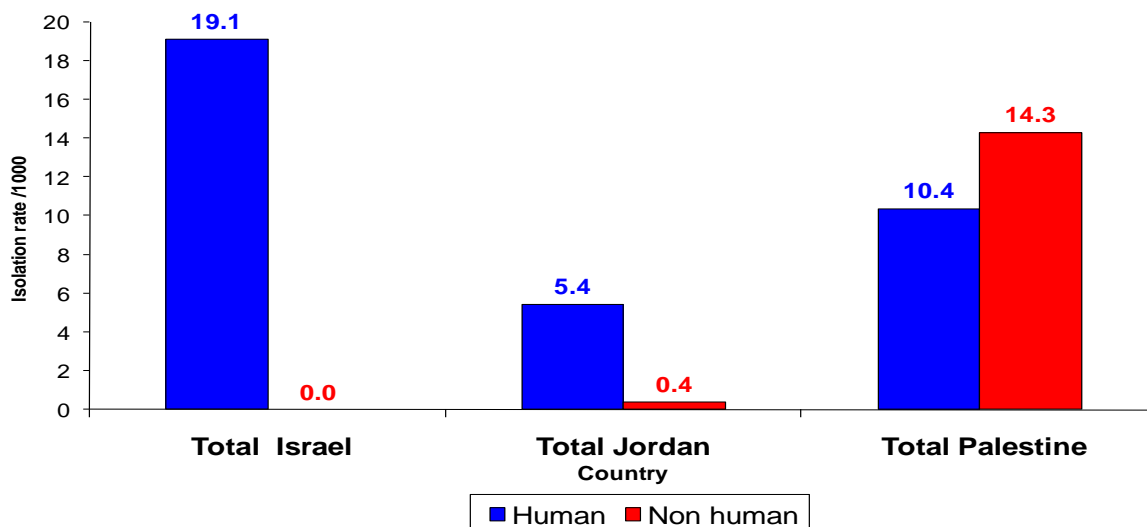


\* logarithmic scale

The isolation rate for human specimens was 19.1, 5.4 and 10.4/1000 for Israel, Jordan and Palestine respectively.

The isolation rate for the non human specimens for Jordan was 0.4/1000 and for Palestine 14.3 /1000; there aren't non human specimens from Israel; figure 5.

**Figure 5; Salmonella isolation Rate/1000, from both human and non human Specimens 2005-2009 by country**



The following summary table illustrates total number of tested specimens “both human and non human”, number of Salmonella isolates, number of serogrouped and number of Serotyped Salmonella isolates from MECIDS partners by year, table 3.

**Table 3; Total human and non human Salmonella isolates from MECIDS partners by Serogroups and year of isolation**

Salmonella Seogroups	Israel						Jordan						palestine						Total isolates; Israel	Total isolates; Jordan	Total isolates; Palestine	Grand total
	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010				
Salmonella A	3	9	6	3	20	2	0	0	0	0	0	0	0	0	0	0	0	0	43	0	0	43
Salmonella B	141	141	85	105	80	90	11	32	10	18	16	24	4	20	22	14	26	9	642	111	95	848
Salmonella C	0	23	13	28	6	29	0	0	0	0	0	0	0	4	21	1	0	0	99	0	26	125
Salmonella C1	185	301	254	265	394	434	4	7	5	8	10	4	4	40	24	16	27	36	1833	38	147	2018
Salmonella C2	107	187	138	145	114	110	9	25	7	12	3	10	2	39	31	26	23	2	801	66	123	990
Salmonella C2-C3	5	1	2	4	3	7	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	22
Salmonella C3	12	6	6	1	1	0	0	0	0	0	0	0	8	0	0	0	0	0	26	0	8	34
Salmonella D	240	250	172	168	237	219	19	20	45	9	23	18	5	5	5	2	1	2	1286	134	20	1440
Salmonella D1	0	0	1	4	3	5	0	0	0	0	0	0	1	0	0	1	2	2	13	0	6	19
Salmonella E	13	20	24	35	14	23	4	12	17	9	3	1	0	0	2	3	0	0	129	46	5	180
Salmonella E1	0	1	0	1	6	6	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	14
Salmonella F	1	1	0	1	4	8	0	0	0	1	0	0	0	3	14	18	4	0	15	1	39	55
Salmonella G	3	9	2	12	10	18	0	1	2	1	1	3	0	1	0	0	0	0	54	8	1	63
Salmonella H	0	1	2	0	0	2	0	0	2	0	0	2	0	0	0	0	0	0	5	4	0	9
Salmonella I	22	3	13	12	20	13	0	0	0	0	0	0	0	0	0	0	0	0	83	0	0	83
Salmonella K	1	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	2	3	0	5
Salmonella L	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella M	3	5	5	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	16	1	0	17
Salmonella N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Salmonella O	1	1	3	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
Salmonella Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonella P	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella Q	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella R	0	1	0	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8
Salmonella S	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Salmonella spp.	34	22	158	131	29	69	6	6	8	4	0	2	0	0	0	1	1	1	443	26	3	472
Salmonella T	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
Salmonella X	1	0	0	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9
Salmonella Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total No. specimens	70272	69689	42617	39209	33586	35483	14422	33889	37943	43152	47318	39294	21649	12236	4987	6318	7626	6707	290856	216018	59523	566397
Total No. serogrouped isolates	773	986	885	924	951	1048	53	103	97	64	56	66	193	129	126	115	137	70	5567	439	770	6776
Isolation Rate/1000	11.0	14.1	20.8	23.6	28.3	29.5	3.7	3.0	2.6	1.5	1.2	1.7	8.9	10.5	25.3	18.2	18.0	10.4	19.1	2.0	12.9	12.0

The following summary table illustrates human Salmonella isolates from MECIDS partners by Serogroups and year of isolation, table 4.

**Table 4; Total human Salmonella isolates from MECIDS partners by Serogroups and year of isolation**

Salmonella Seogroups	Israel						Jordan						palestine						Total isolates; Israel	Total isolates; Jordan	Total isolates; Palestine	Grand total
	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010				
Salmonella A	3	9	6	3	20	2	0	0	0	0	0	0	0	0	0	0	0	0	43	0	0	43
Salmonella B	141	141	85	105	80	90	11	30	9	11	9	22	1	2	4	0	3	0	642	92	10	744
Salmonella C	0	23	13	28	6	29	0	0	0	0	0	0	0	4	21	0	0	0	99	0	25	124
Salmonella C1	185	301	254	265	394	434	4	6	5	6	7	3	0	35	4	0	0	2	1833	31	41	1905
Salmonella C2	107	187	138	145	114	110	9	24	7	11	3	10	0	4	0	1	2	0	801	64	7	872
Salmonella C2-C3	5	1	2	4	3	7	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	22
Salmonella C3	12	6	6	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	26	0	2	28
Salmonella D	240	250	172	168	237	219	19	15	39	9	14	16	0	2	4	0	0	0	1286	112	6	1404
Salmonella D1	0	0	1	4	3	5	0	0	0	0	0	0	1	0	0	0	0	0	13	0	1	14
Salmonella E	13	20	24	35	14	23	4	11	17	8	2	1	0	0	2	2	0	0	129	43	4	176
Salmonella E1	0	1	0	1	6	6	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	14
Salmonella F	1	1	0	1	4	8	0	0	0	1	0	0	0	0	0	0	0	0	15	1	0	16
Salmonella G	3	9	2	12	10	18	0	1	2	0	0	1	0	1	0	0	0	0	54	4	1	59
Salmonella H	0	1	2	0	0	2	0	0	2	0	0	2	0	0	0	0	0	0	5	4	0	9
Salmonella I	22	3	13	12	20	13	0	0	0	0	0	0	0	0	0	0	0	0	83	0	0	83
Salmonella K	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	4
Salmonella L	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella M	3	5	5	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	16	1	0	17
Salmonella N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Salmonella O	1	1	3	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
Salmonella Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonella P	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella Q	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonella R	0	1	0	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8
Salmonella S	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Salmonella spp.	34	22	158	131	29	69	6	6	8	3	0	2	0	0	0	1	1	0	443	25	2	470
Salmonella T	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
Salmonella X	1	0	0	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9
Salmonella Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total No. specimens	70272	69689	42617	39209	33586	35483	5000	11599	13174	13102	13759	13304	12842	6921	302	343	143	152	290856	69938	20703	381497
Total No. serogrouped isolates	773	986	885	924	951	1048	53	93	90	51	35	58	80	52	35	15	31	2	5567	380	215	6162
Isolation Rate/1000	11.0	14.1	20.8	23.6	28.3	29.5	10.6	8.0	6.8	3.9	2.5	4.4	6.2	7.5	115.9	43.7	216.8	13.2	19.1	5.4	10.4	16.2

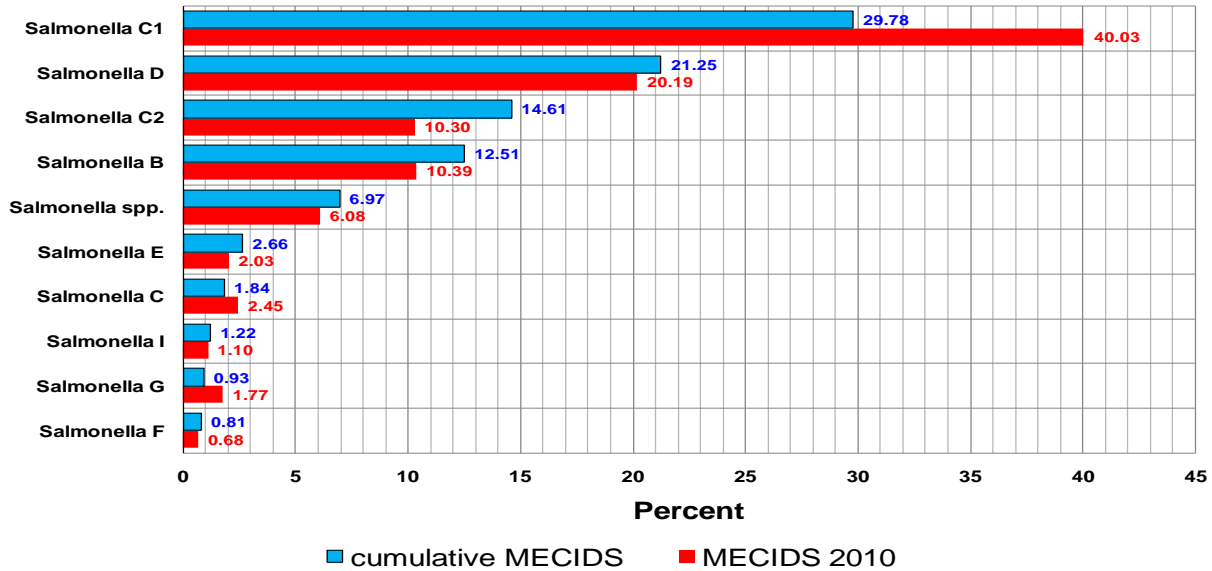
The following summary table illustrates non human Salmonella isolates from MECIDS partners by Serogroups and year of isolation, table 5.

**Table 5; Total non human Salmonella isolates from MECIDS partners by Serogroups and year of isolation**

Salmonella Seogroups	Israel						Jordan						palestine						Total isolates; Israel	Total isolates; Jordan	Total isolates; Palestine	Grand total	
	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010					
Salmonella A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonella B	0	0	0	0	0	0	0	2	1	7	7	2	3	18	18	14	23	9	0	19	85	104	
Salmonella C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	
Salmonella C1	0	0	0	0	0	0	0	1	0	2	3	1	4	5	20	16	27	34	0	7	106	113	
Salmonella C2	0	0	0	0	0	0	0	1	0	1	0	0	2	35	31	25	21	2	0	2	116	118	
Salmonella C2-C3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella C3	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6	6	
Salmonella D	0	0	0	0	0	0	0	5	6	0	9	2	5	3	1	2	1	2	0	22	14	36	
Salmonella D1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	5	5	
Salmonella E	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	3	1	4	
Salmonella E1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella F	0	0	0	0	0	0	0	0	0	0	0	0	0	3	14	18	4	0	0	0	39	39	
Salmonella G	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	4	0	4	
Salmonella H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella K	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	
Salmonella L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella spp.	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	2	
Salmonella T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total number of stool cultures	0	0	0	0	0	0	9422	22290	24769	30050	33559	25990	8807	5315	4685	5975	7483	6555	0	146080	38820	184900	
Total Salmonella Isolates	0	0	0	0	0	0	0	10	7	13	21	8	113	77	91	100	106	68	0	59	555	614	
Isolation rate / 1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.4	0.6	0.3	12.8	14.5	19.4	16.7	14.2	10.4	0.0	0.4	14.3	3.3	

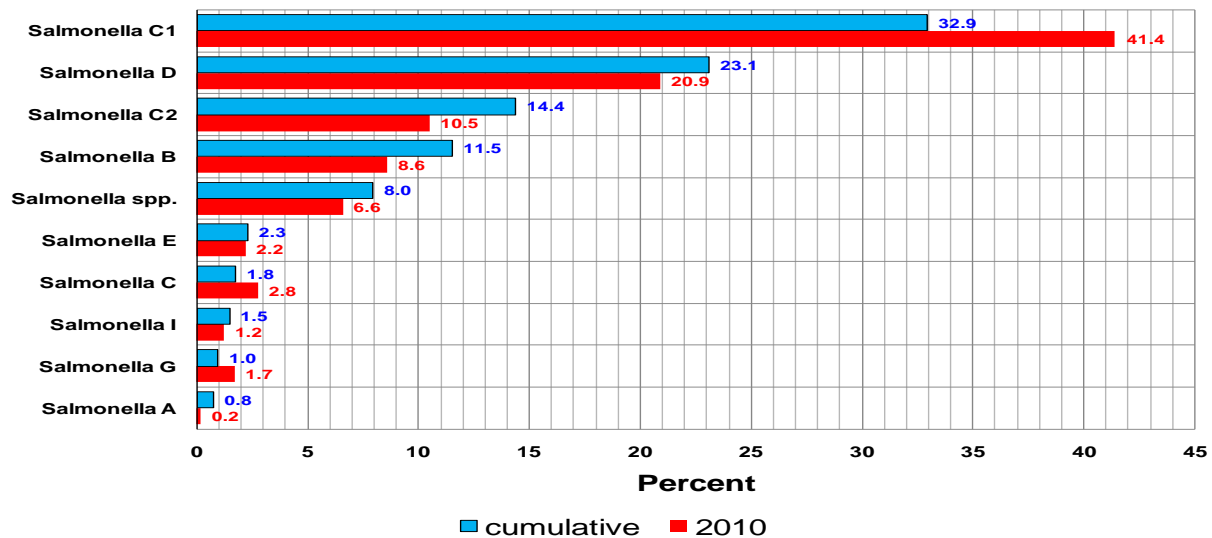
The most common Salmonella Serogroups tested at the regional level were Salmonella group C1 (30%), Salmonella group D (21%), Salmonella group C2 (15%) and Salmonella group B (13%); in 2010, there is increasing in the proportion of Serogroups C1, C and G, else Serogroups takes the same pattern as in previous year's figure 6.

**Figure 6; Top ten Sero-grouped Salmonella Isolates at MECIDS regional level 2005-2010**



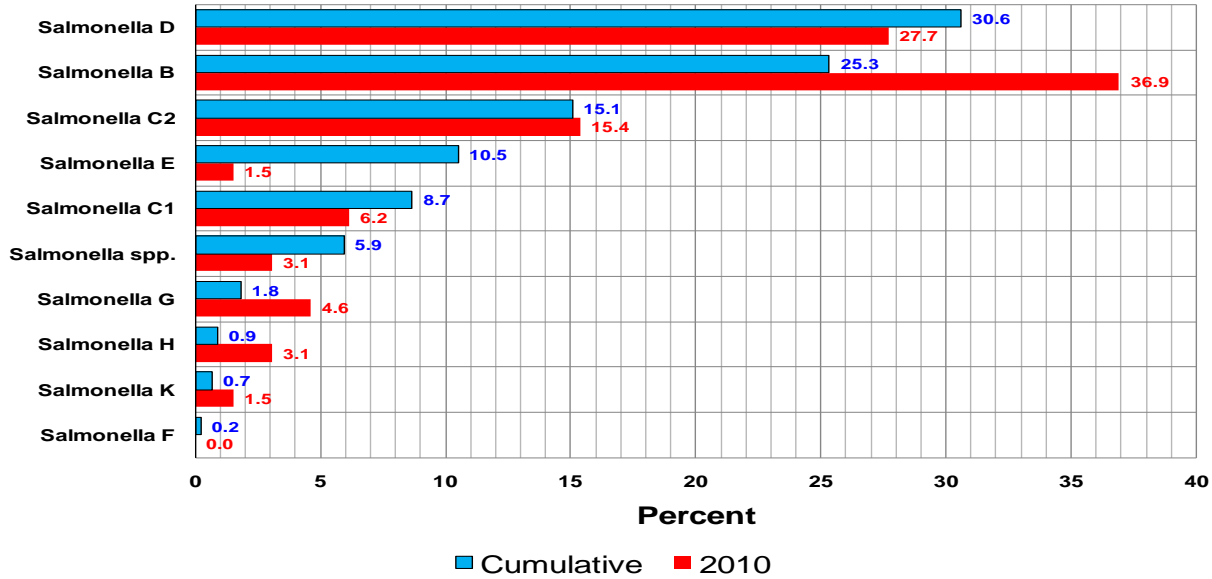
The most common Salmonella Serogroups tested in Israel were Salmonella group C1 (33%) followed by Salmonella group D (23%); due to fact that the tested specimens mostly were from Israel the pattern of Serogroups distribution is identical to Serogroups pattern from all MECIDS partners. figure 7.

**Figure 7; Top ten Sero-grouped Salmonella Isolates, Israel 2005-2010**



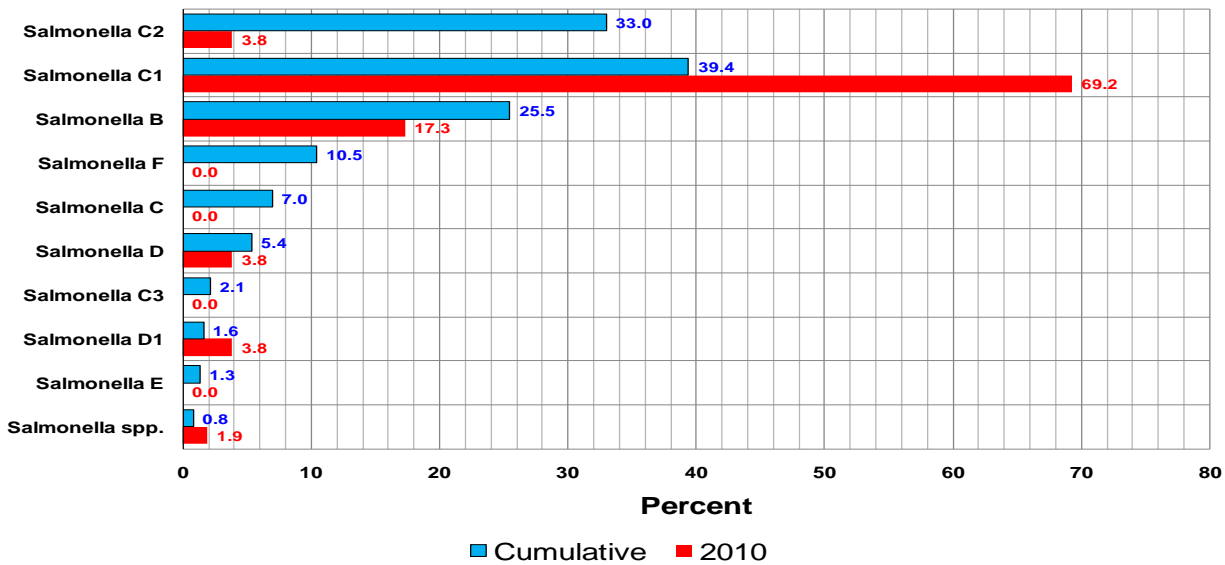
The most common Salmonella Serogroups tested in Jordan in were Salmonella group D (31%) followed by Salmonella group B(25%) and Salmonella C2 (15%); in 2010, there is increasing in the proportion of salmonella Serogroups B, G and H, else Serogroups takes the same pattern as in previous years ; figure 8.

**Figure 8; Top ten Sero-grouped Salmonella Isolates, Jordan 2005-2010**



The most common Salmonella Serogroups tested in Palestine were Salmonella group C2 (33%) followed by Salmonella group C1 (39%), in 2010, there is increasing in the proportion of salmonella Serogroups C1, and D1; figure 8. figure 9.

**Figure 9; Top ten Sero-grouped Salmonella Isolates, Palestine 2005-2009**



Despite a big variation in the number of tested specimens and yielded isolates between MECIDS partners, were observed a temporal association in the number of isolation for certain serogroups of Salmonella among MECIDS partners; were observed a temporal association in the isolation of Salmonella group C2; in September-October 2005, July, September-November 2006, June 2007, May, August-September 2008, and June, November 2009. figure 10-a.

Figure 10-a, Distribution of salmonella isolation group C2 isolated from both human and non human specimens from MECIDS partners 2005-2010 by month of isolation

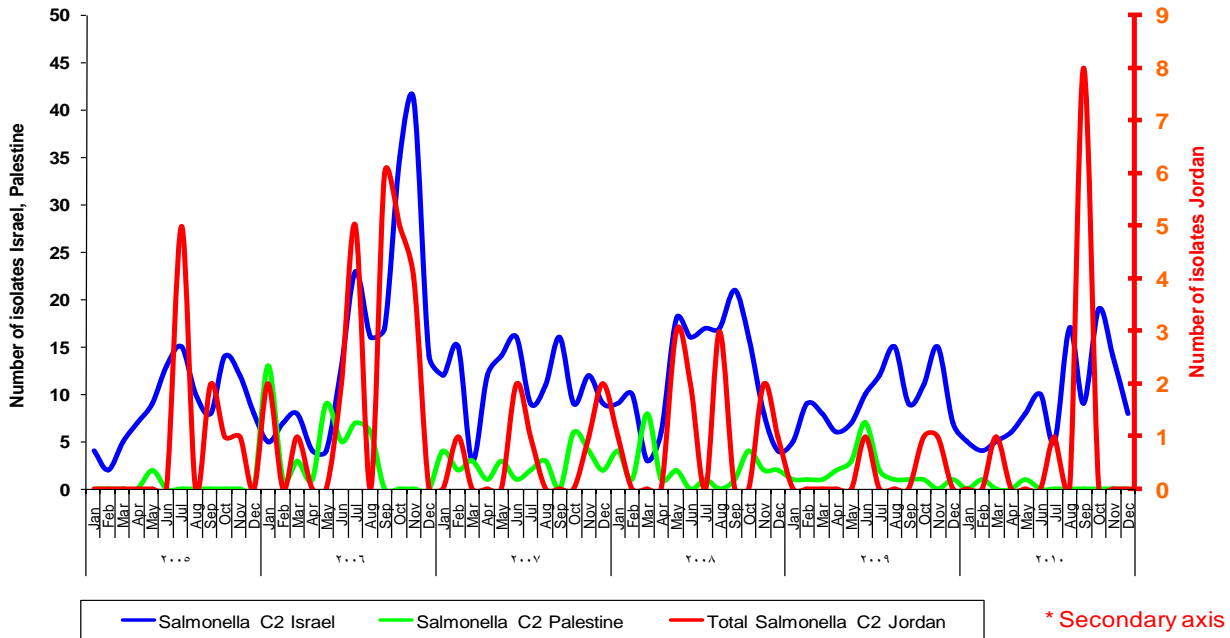
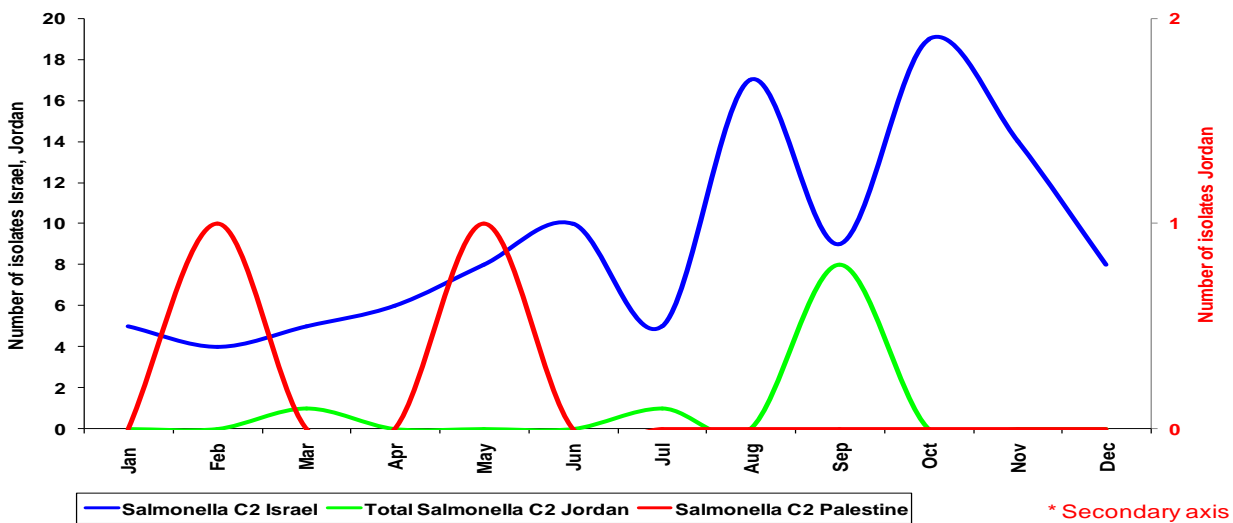


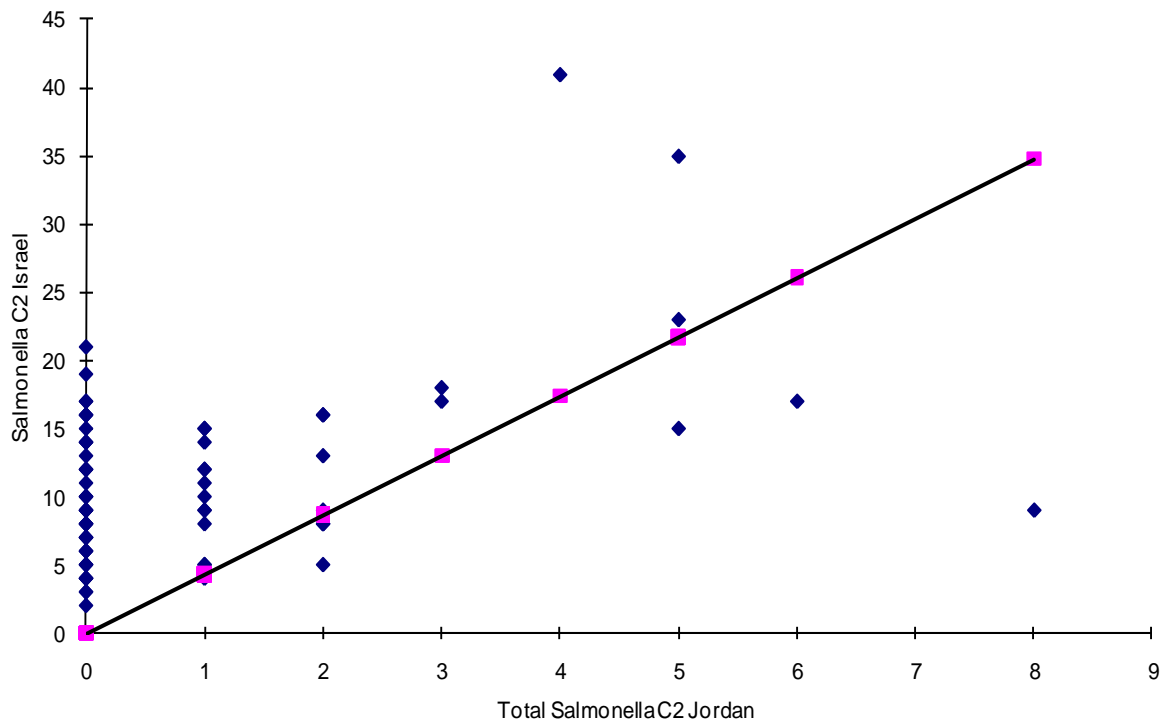
Figure 10-b, Distribution of salmonella isolation group C2 isolated from both human and non human specimens from MECIDS partners 2010 by month of isolation



A regression analysis were performed to identify correlations in the occurrence of certain salmonella Serogroups within MECIDS partners and was found that there was a relatively strong correlation in the sequences of occurrence for Salmonella group C2 in Jordan and Israel;  $r=0.63$ .

$r^2=0.39$ ; this mean that the variation in the occurrence of Salmonella gr. C2 accounts for 39% of the total variation in the monthly occurrence of Salmonella gr. C2 so 39% of the occurrence of Salmonella gr. C2 in one country could be related to the other country, but the correlation between Palestine and Israel was less  $r=0.44$ ,  $r^2 =0.19$ ,and finally the correlation between Jordan and Palestine was weak  $r=0.27$ ,  $r^2 =0.07$  or figure 11.

Figure 11, Correlation of occurrence of Salmonella group C2 in Jordan and Israel 2005-2010





Same applies for Salmonella group C1, were observed a temporal association in the isolation in November 2005, August 2006, August 2007, July – August 2008, and July – August 2009 figure 12.

Figure 12-a; Distribution of salmonella group C1 isolated from both human and non human specimens from MECIDS partners 2005-2009 by month of isolation

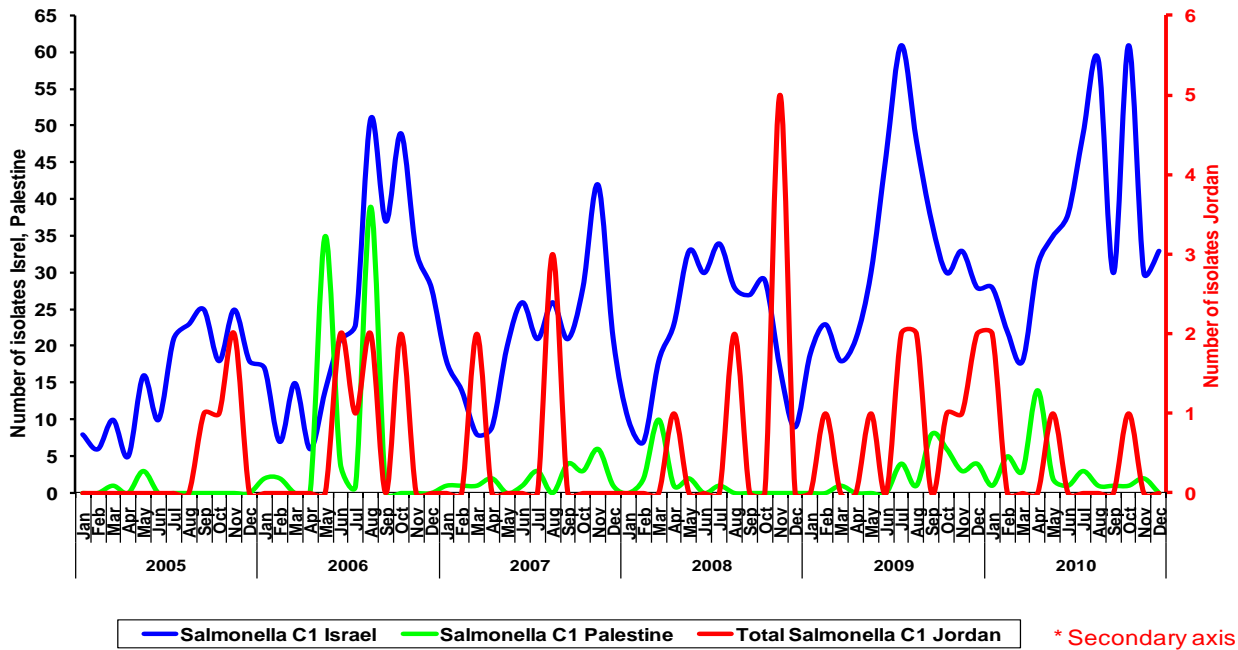
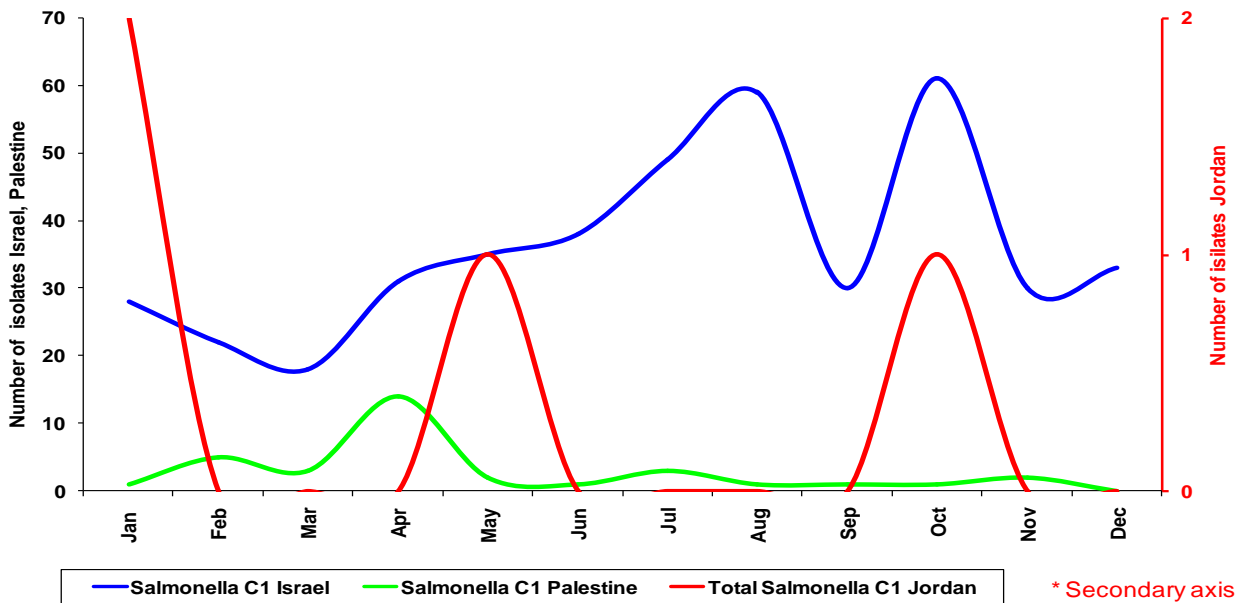


Figure 12-b; Distribution of salmonella group C1 isolated from both human and non human specimens from MECIDS partners 2010 by month of isolation



Also were observed a temporal association in the isolation in May – June 2005, February-March 2006, January 2007, December 2007, and July 2008, and June, October 2009 for Salmonella group B figure 13.

Figure 13-a; Distribution of salmonella group B isolated from both human and non human specimens from MECIDS partners 2005-2008 by month of isolation

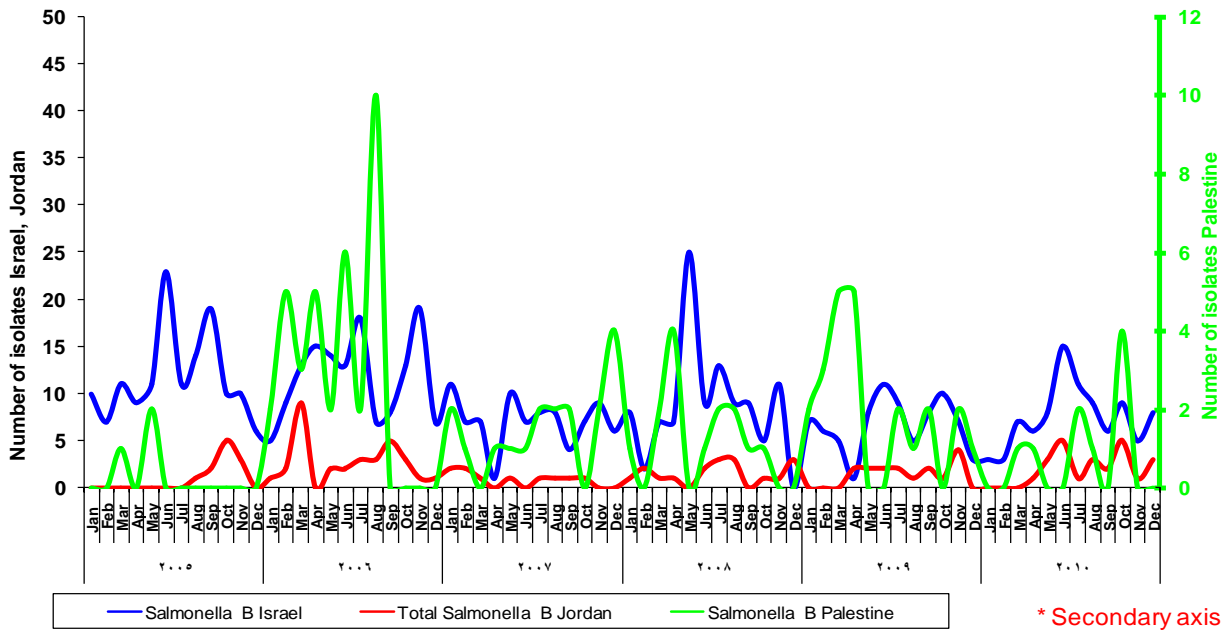
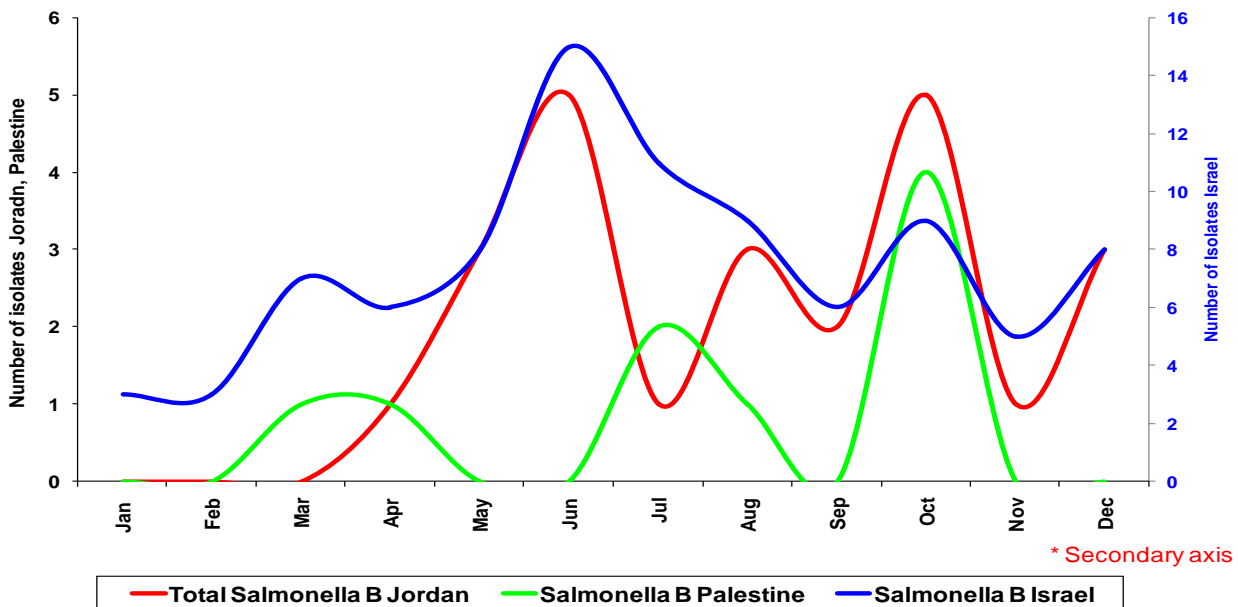


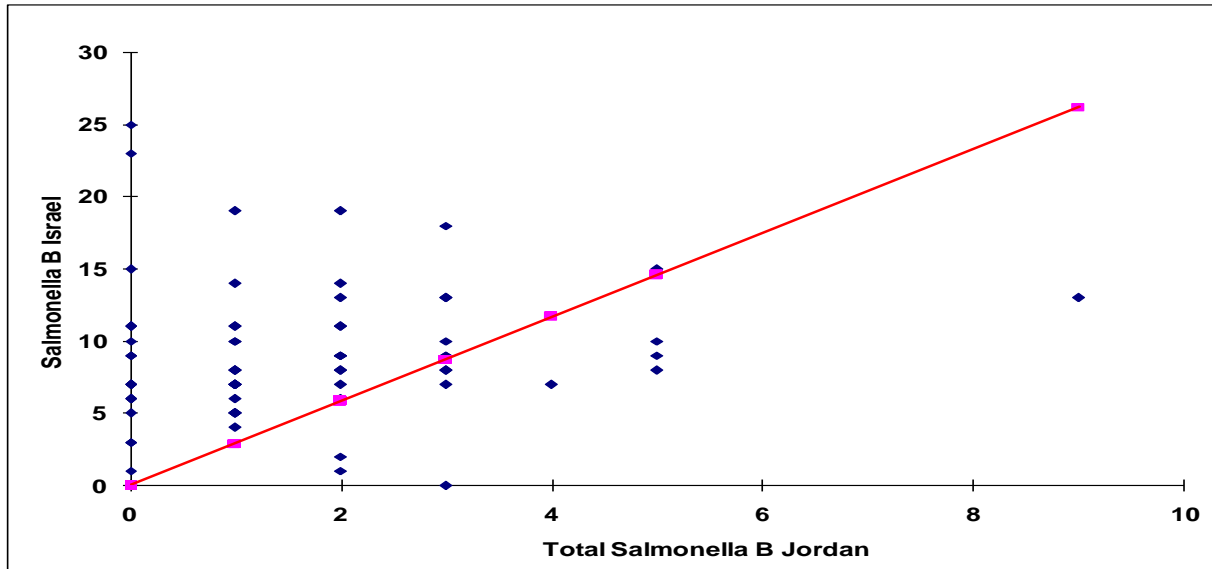
Figure 13-b; Distribution of salmonella group B isolated from both human and non human specimens from MECIDS partners 2010 by month of isolation



Same as in C2 there was a strong correlation in the sequences of occurrence for Salmonella group B in Jordan and Israel;  $r=0.65$ .

$r^2=0.43$ ; this means that the variation in the occurrence of Salmonella gr. B accounts for 43% of the total variation in the monthly occurrence of Salmonella gr. B so 43% of the occurrence of Salmonella gr. B in one country could be related to the other country, but the correlation between Palestine and Israel was less  $r=0.51$ ,  $r^2=0.26$ , and finally the correlation between Jordan and Palestine was weak  $r=0.48$ ,  $r^2=0.23$  or figure

Figure 14, Correlation of occurrence of Salmonella group B in Jordan and Israel 2005-2009



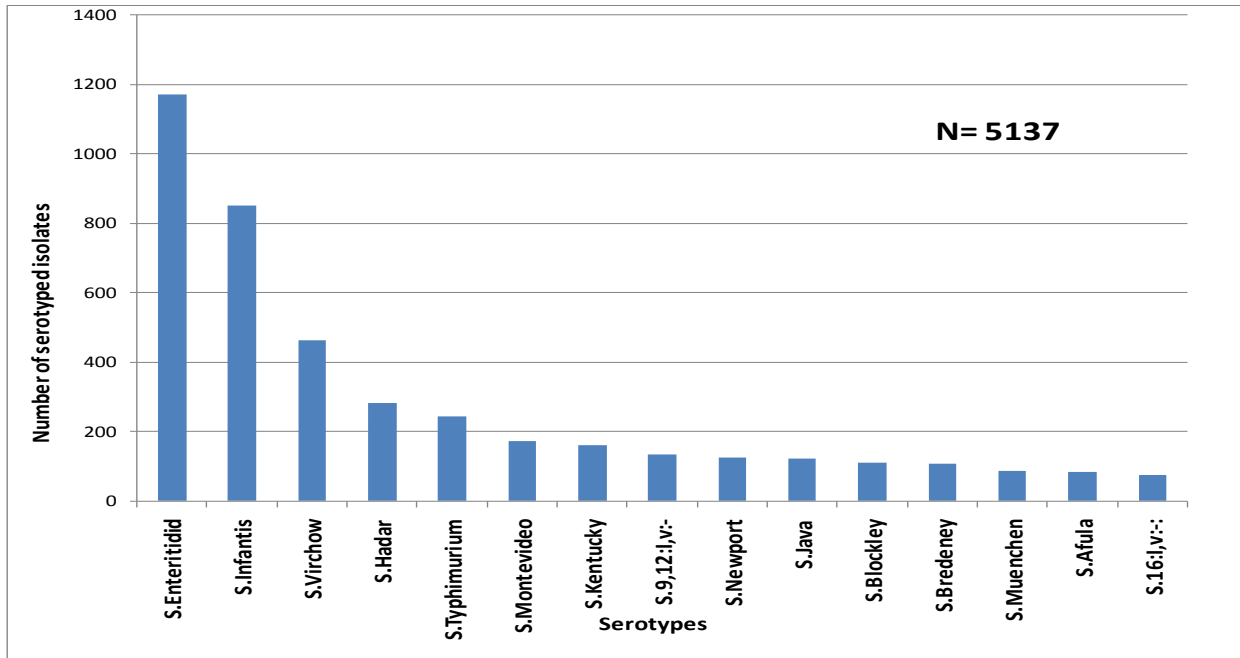
For the other serogroups there were no correlation or a weak correlation, table 6 summarizes the Correlation in the occurrence of Salmonella groups in the MECIDS countries.

Table 6, Correlation of Salmonella groups in the MECIDS countries

Serogroup	countries	(r) correlation coefficient	(r <sup>2</sup> ) coefficient of determinants
B	Israel - Jordan	0.65	0.43
	Israel - Palestine	0.51	0.26
	Jordan - Palestine	0.48	0.23
C1	Israel - Jordan	0.52	0.27
	Israel - Palestine	0.40	0.16
	Jordan - Palestine	0.23	0.05
C2	Israel - Jordan	0.63	0.39
	Israel - Palestine	0.44	0.19
	Jordan - Palestine	0.27	0.07
D	Israel - Jordan	0.35	0.12
	Israel - Palestine	0.36	0.13
	Jordan - Palestine	0.08	0.01

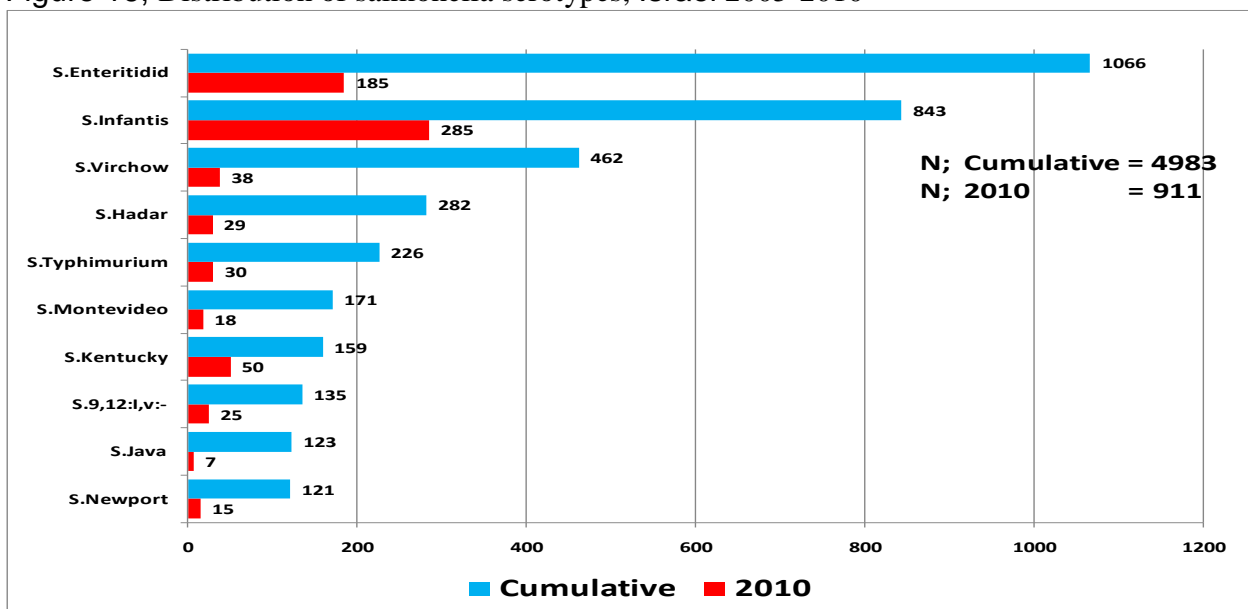
The total number of serotyped isolates from MECIDS partners was 5137; the most common serotypes were Salmonella enteritidis, Salmonella infantis and Salmonella virchow figure 15.

Figure 15; Top 15 salmonella serotypes, MECIDS 2005-2010



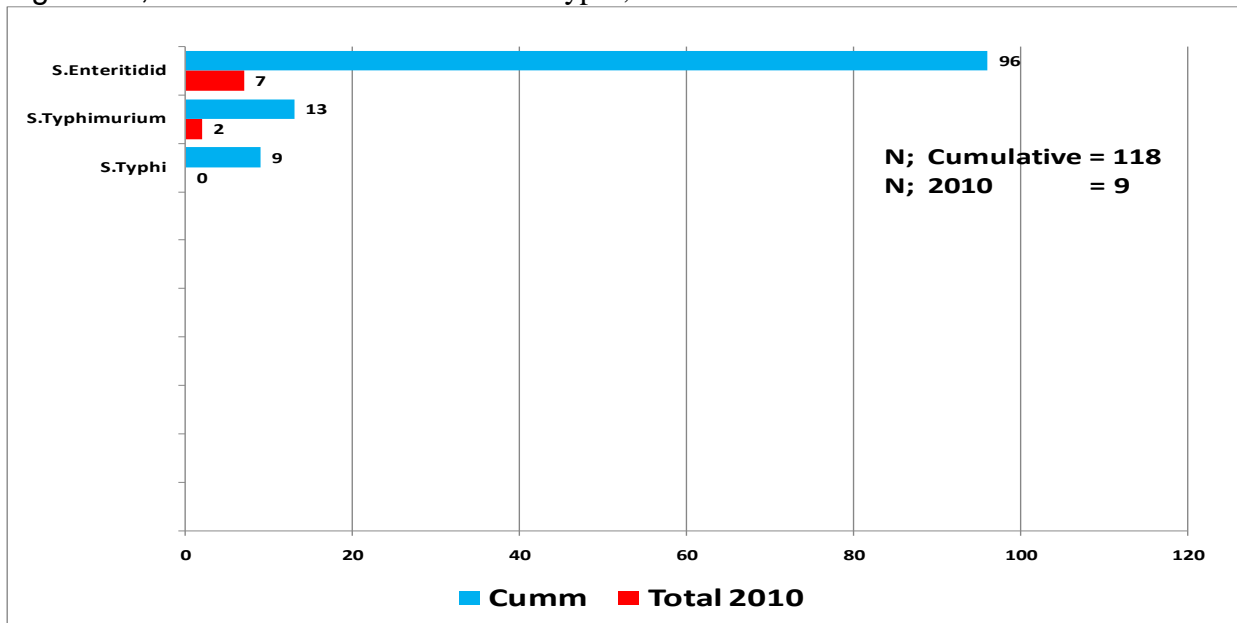
The total number of serotypes identified from Israel was 4983, the most common serotype was Salmonella D, enteritidis 1065 (21%); in 2010 Salmonella C1, infantis was the most common 285 (31%) figure 15 illustrates top 10 serotypes from Israel,

Figure 16, Distribution of salmonella serotypes, Israel 2005-2010



The total number of serotypes from Jordan was 118, the most common was Salmonella D, enteritidis 96 (81%), only three serotypes were identified figure 16;

Figure 17, Distribution of salmonella serotypes, Jordan 2005-2010



The total number of serotypes from Palestine was 36; the most common was Salmonella D, enteritidis 9 (25%), in 2010 Salmonella C1, infantis was the most common 4 (40%) figure 17 illustrates top 10 serotypes from Palestine;

Figure 18, Distribution of salmonella serotypes, Palestine 2005-2010

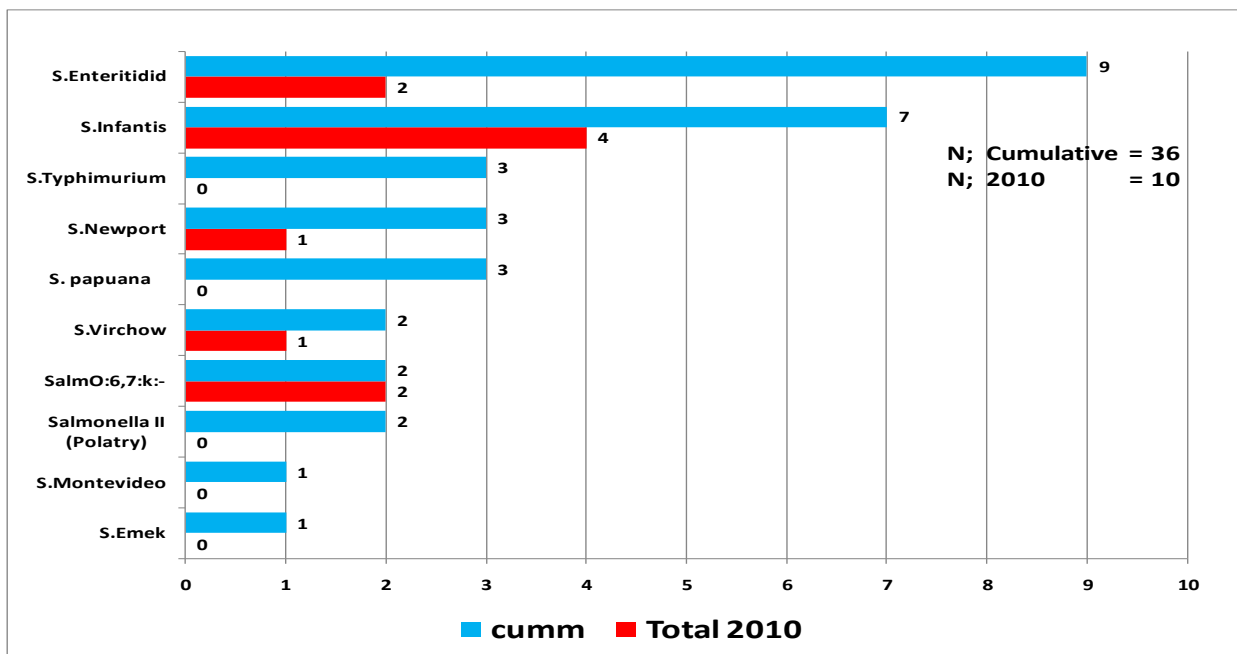




Table 7-b Summary table for Salmonella Serogroups and serotypes by MECIDS partners and year

Country	Salmonella Serotypes	Israel						Jordan						Palastine						Grand total Israel	Grand total Jordan	Grand total Palestine	Grand total	
		Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010	Total 2005	Total 2006	Total 2007	Total 2008	Total 2009	Total 2010					
Salmonella C3	S.Emek	12	6	6	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	26	0	1	27	
	S.Corvallis	5	1	2	4	2	5	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	19	
Salmonella C2-C3	S.Albany	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.Glostrup	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.8,20:-:z6	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.9,12:-:v-	189	200	138	139	215	185	13	13	37	7	19	7	5	0	0	0	2	2	1066	96	9	1171	
Salmonella D	S.9,12:-:v-	24	34	24	17	11	25	0	0	0	0	0	0	0	0	0	0	0	0	135	0	0	135	
	S.9,12:-:v-	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
	S.Tarshyne	5	7	2	2	4	3	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	
	S.Goeteborg	10	6	5	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	25	
	S.Goettingen	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
	S.Typhi	3	1	2	1	4	2	6	2	0	1	0	0	0	0	0	0	0	0	13	9	0	22	
	S.Eastbourne	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	1	4	
	S.9,12:-:1,5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	Salmonella D1	S.Frintrop	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		S.Wangata	0	0	0	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
S.Panama		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella E	S.Anatum	4	10	9	16	6	5	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	50	
	S.Senfentenberg	2	4	10	15	2	17	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	50	
	S.Meleagridis	1	2	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	
	S.Give	5	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	
	S.Liverpool	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
	S.Zanzibar	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
	S.Wangata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	S.Lomalinda	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	Salmonella E1	S.Weltvreden	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
		S.Muenster	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
S.Amager		0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
S.Kalina		0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	
Salmonella F	S.Rubislaw	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
	S.Nyanza	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella G	S.2[nachshonim]	2	4	0	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	14	
	S.13,23:-:v-	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.havana	0	2	1	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	
	S.Telikebir	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
	S.Idikan	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
	S.cubana	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Salmonella H	S.13,23:-:v-	0	0	0	0	6	10	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	16	
	S.Charity	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
	S.Fluntern	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella I	S.16:i,v:-	22	3	17	12	19	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	0	73	
	S.Hvittingfoss	0	0	0	0	1	13	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	14	
Salmonella K	S.Malstatt	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.pomona	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella L	S.Cerro	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.Rhone	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella M	S.telaviv	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
	S.Vitkin	1	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	
	S.Halle	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.Umbilo	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
	S.Pomona	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella N	S.Ilala	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
	S.matopenni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella O	S.Alachua	1	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	
	S.IIIB 61:i:z53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella P	S.Freetown	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella Q	S.Wandsworth	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Salmonella R	S.Johannesburg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella S	S.II(negev)	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
Salmonella T	S.II (uphill)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salmonella X	S.II (Khami)	1	0	0	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	
Salmonella Z	S.II 50:b:z6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total No. specimens		70272	69689	42617	39209	33586	35483	14422	33889	37943	43152	47318	39294	21649	12236	4987	6318	7626	6707	290856	216018	59523	566397	
Total No. serogrouped isolates		773	986	885	924	951	1048	53	103	97	64	56	66	193	129	126	115	137	70	5567	439	770	6776	
Total No. serotyped isolates		747	941	723	753	919	917	23	19	39	9	19	9	17	0	4	0	5	10	5000	118	36	5137	