Middle East Consortium on Infectious Disease Surveillance (MECIDS)

Regional network for laboratory-based surveillance of foodborne diseases

Background (1)

- Globalization of food and centralization of its production have important economic advantages
- However, under these circumstances, accidental or deliberate contamination of food can lead to epidemics that can affect large populations.
- Exposure to a high infective dose of enteropathogens may significantly increase complication and fatality rates, especially among young children and aged people.

Background (2)

- Many scientific articles describing naturally occurring epidemics of foodborne diseases including national and even international spread of enteropathogens.
- A few reports on incidents in which intentionally contaminated food caused outbreaks of shigellosis and salmonellosis in the USA
- Two review papers assessed the threat of bioterrorism on the food supply
- Foodborne pathogens were classified by the CDC as a category 2-level candidates for being used as bio-weapons

Background (3)

Solution

- To establish enhanced surveillance networks to provide baseline information against which clusters of disease can be identified.
- To obtain information on the microbial etiology of the disease and on the phenotypic and genotypic characterization of the recovered agents
- To link laboratory data with variables related to the ill subjects

Goal and Rationale (defined by MECIDS members)

- **Goal**: To establish a regional system of surveillance of foodborne diseases in the Middle East.

- **Rationale**: In view of the close proximity among the 3 countries and a level of food exchange that hopefully will increase in the near future it was anticipate that the significant upgrading in the methods of surveillance will play an important role in the prevention and control of occurrence and transmission of foodborne diseases in the whole region.

Overall objectives

- To establish or enhance of national laboratory-based surveillance networks for foodborne diseases in Jordan, Israel and the Palestinian Authority
- To use harmonized methodology
- To develop a common platform of communication, data sharing and analysis
- To discuss intervention steps when needed.

What happened next ?

- A detailed joint protocol and budget based on these goal and objectives was submitted by the 3 countries to SFCG and NTI.
- Due to paucity of funds, NTI and SFCG committed to support just one year of initial activities in each of the 3 countries that will focus on one of the foodborne pathogen (Salmonella). It was agreed that in this framework each country will outline its specific objectives that will fit the overall goal of the establishment of the regional foodborne diseases surveillance network.

Middle East Consortium on Infectious Disease Surveillance (MECIDS)

Laboratory-based surveillance of foodborne diseases

Report on activities conducted in Israel (Dec 2004-March 2006)

Objectives for the first year (1)

- Collect Salmonella data at selected sentinel laboratories and improve the transfer of data to the central data analysis unit.
- Improve phenotypic and genotypic characterization of Salmonella, Shigella and other foodborne pathogens.
- Perform a case-control study to identify risk factors of salmonellosis due to infection with *Salmonella virchow*, which is an emergent Salmonella pathogen in Israel, and potentially in the Middle East as a whole.
- Conduct a nationwide population based survey to estimate the burden of foodborne infections and assess the level of under reporting in Israel.

Objectives for the first year (2)

- Perform a survey among physicians to assess their knowledge and practice (KAP) regarding foodborne diseases.
- Transfer electronically national data on a monthly basis to the regional data depositary unit at CMC Amman.
- Share data and analysis on foodborne diseases among all MECIDS participants.

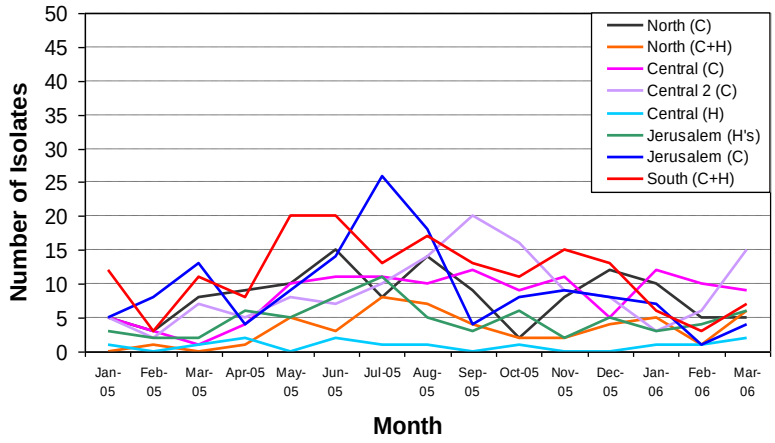
Structure of the network in Israel

- Sentinel Laboratories: 9 laboratories all over Israel (hospital and community)
- Central Lab: Central MOH Laboratory in Jerusalem and Research Lab at Dept. of Epidemiology, Tel Aviv University
- Data analysis unit : (MOH Israel Center for Disease Control and Dept. of Epidemiology, Tel Aviv University)

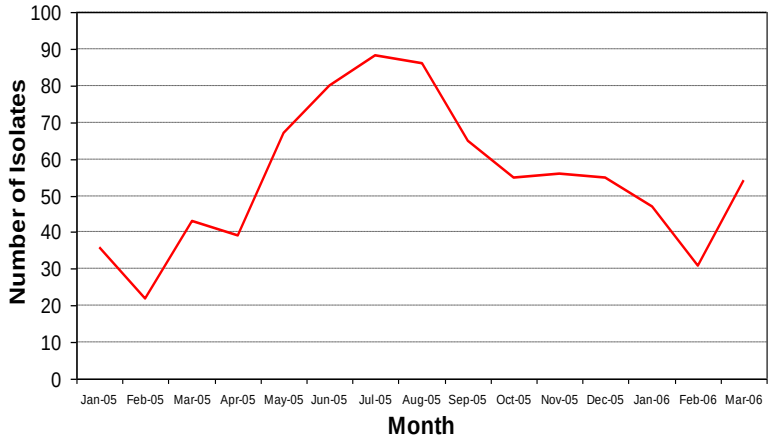
Stool cultures performed at the sentinel laboratories (Jan. 05-March 06)

January 05	5372
February 05	4721
March 05	5455
April 05	4171
May 05	6174
June 05	6264
July 05	6244
August 05	6959
September 05	6312
October 05	4943
November 05	5735
December 05	4759
January 06	4244
February 06	4144
March 06	4409
Total	79906

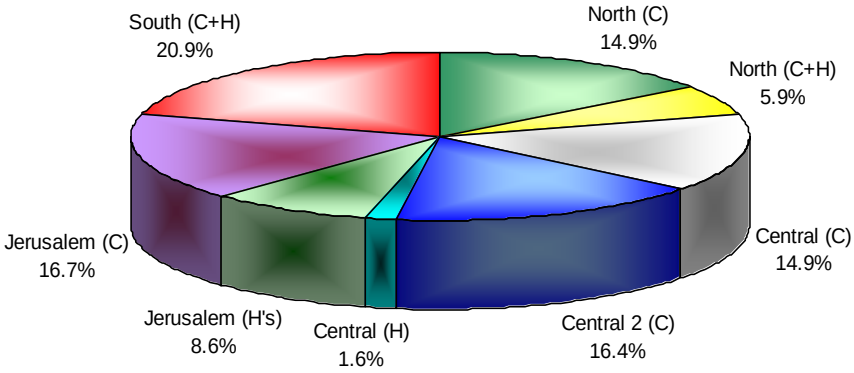
Salmonella isolates (n=824) from stool specimens at the 9 sentinel laboratories from January 2005 to March 2006



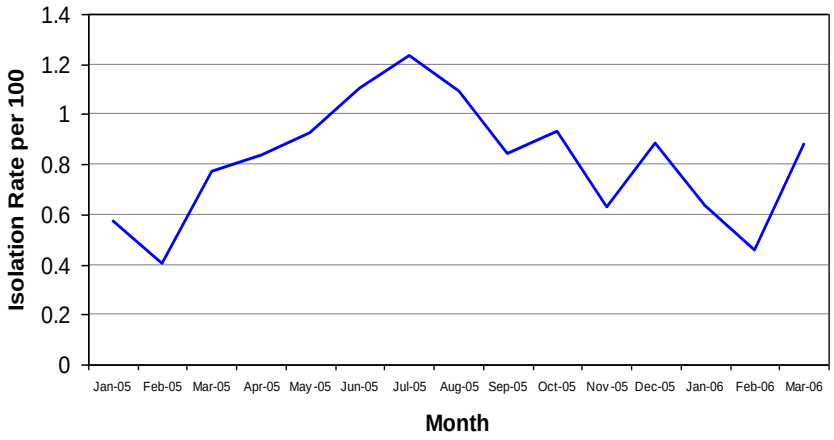
Salmonella isolates at all the sentinel labs between January 2005 and March 2006



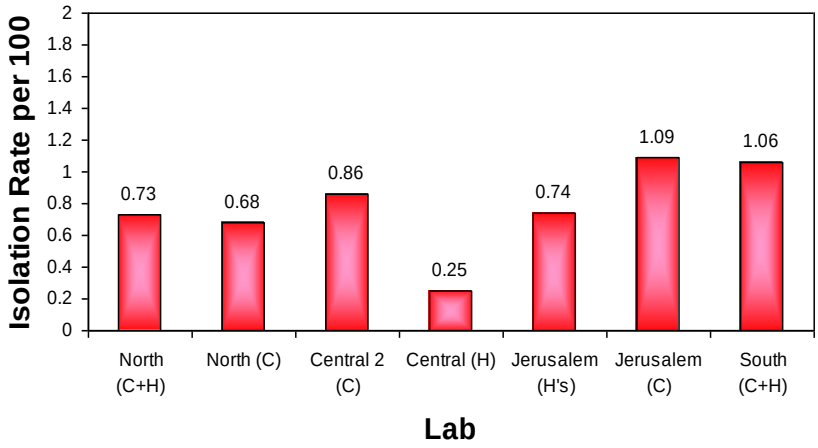
Percentage of *Salmonella* isolated at the various sentinel labs (all isolates from January 2005 to March 2006)



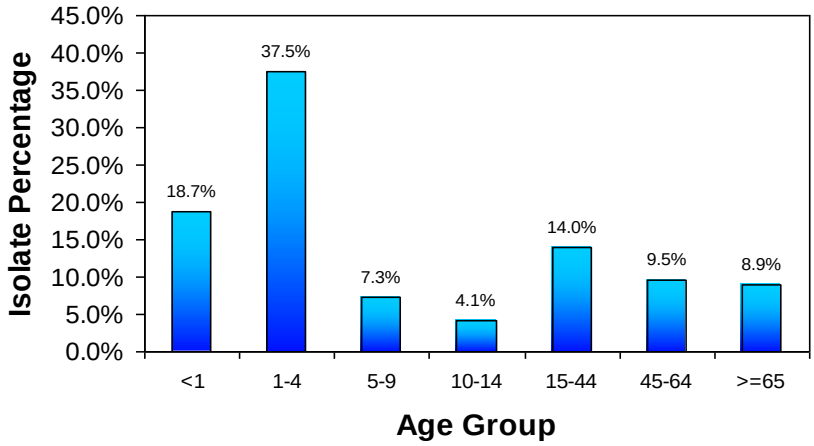
Isolation rate of *Salmonella* at the sentinel labs during the surveillance period



Mean isolation rate by sentinel lab (Jan 05-March 06)



Distribution of *Salmonella* isolates by age (isolates of the period January- December 2005)



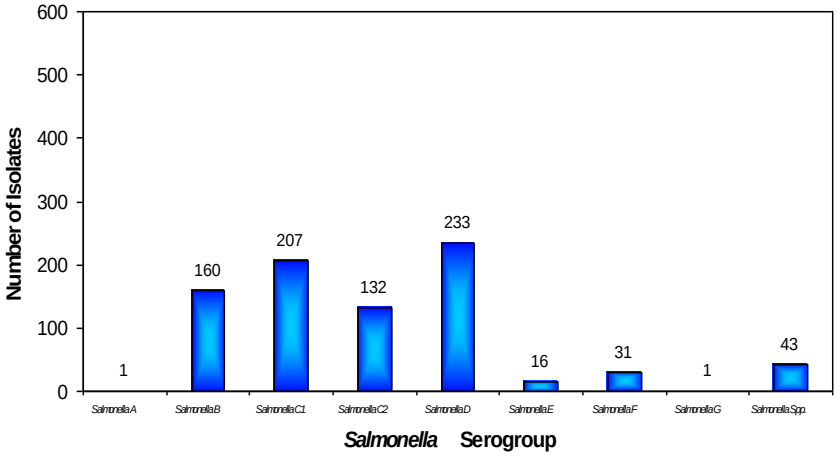
Distribution of *Salmonella* isolates in the first 5 years of life

	Number of isolates (%)
0	128 (33.2%)
1	140 (36.4%)
2	66 (17.1%)
3	32 (8.3%)
4	19 (4.9%)
Total	**385 (100.0%)**

Distribution of *Salmonella* isolates by gender and age group (Jan. 05-Dec. 05)

Age group	Females (%)	Males (%)	Total
<1	62 (18.0%)	66 (19.5%)	**128 (18.7%)**
1-4	119 (34.5%)	137 (40.5%)	**256 (37.5%)**
5-9	22 (6.4%)	28 (8.3%)	**50 (7.3%)**
10-14	13 (3.8%)	15 (4.4%)	**28 (4.1%)**
15-44	59 (17.1%)	37 (11.0%)	**96 (14.1%)**
45-64	36 (10.4%)	29 (8.6%)	**65 (9.5%)**
>=65	34 (9.9%)	26 (7.7%)	**60 (8.8%)**
Total	**345 (100.0%)**	**338 (100.0%)**	**683 (100.0%)**

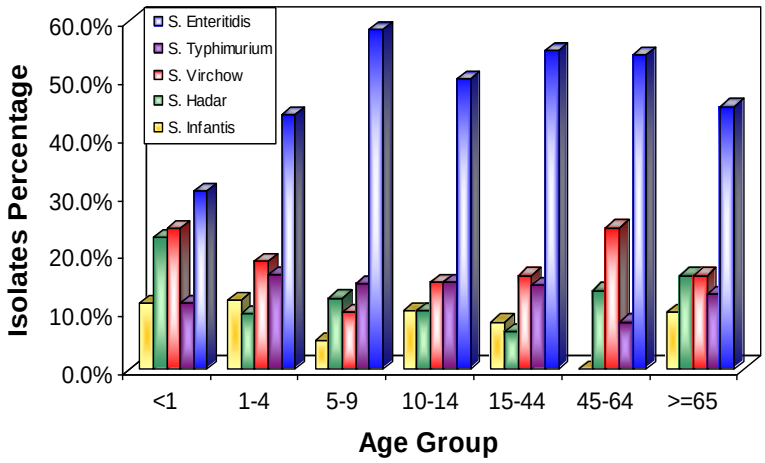
Distribution of *Salmonella* isolates by serogroup



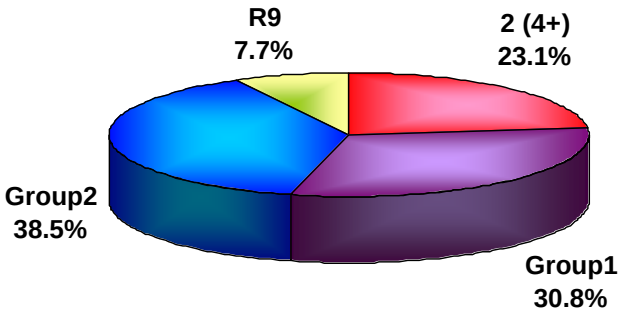
Five most often isolated *Salmonella* serotypes (Jan 05-Dec05)

Salmonella serotype	**Number of Isolates (%)**
S. Enteritidis	185 (23%)
S. Typhimurium	57 (7%)
S. Virchow	72 (9%)
S. Hadar	48 (6%)
S. Infantis	35 (4%)
Others	392 (51%)
Total	**789 (100.0%)**

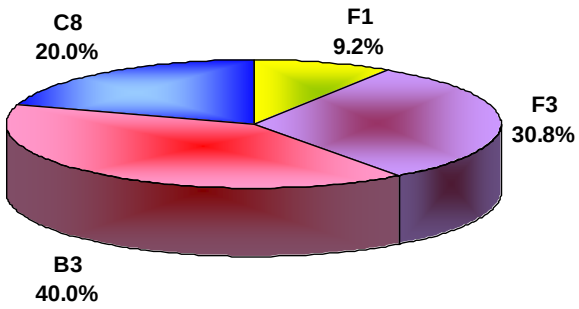
The five most common *Salmonella* serotypes by age group (Jan 05-Dec05)



Phage types of *S.* Typhimurium in a subsample (n=26) of *S.* Typhimurium isolates



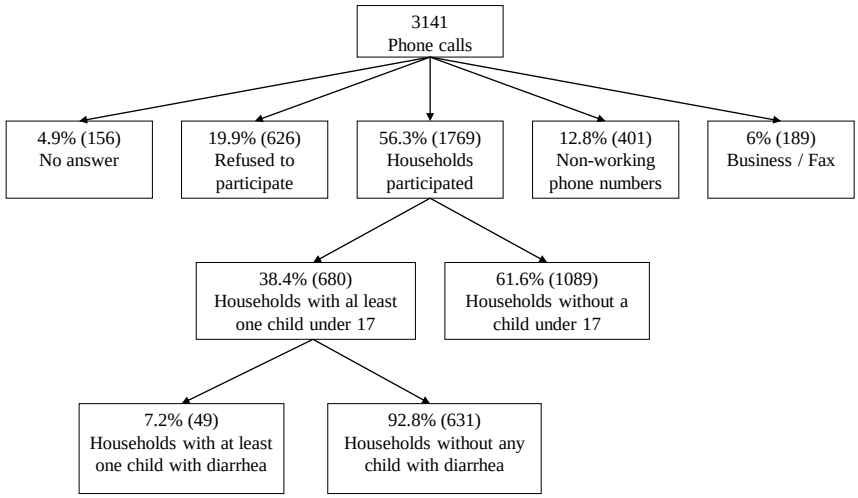
Phage types of S. Enteritidis in a subsample (n=65) of S. Enteritidis isolates



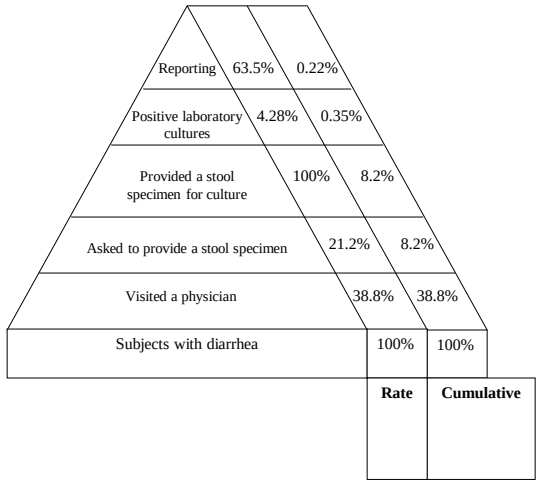
Population survey on the burden of diarrheal diseases

- We conducted a nationwide population based survey to estimate the burden of diarrheal diseases among children and adolescents and assess the level of under reporting in Israel.
- A telephone based population survey was conducted during August, September and October 2005.
- 3141 phone number have been selected randomly from all the phone books of Israel.

Flow chart of households selection process



The chain of events from occurrence of cases of diarrhea in the general population to reporting



הפקולטה לרפואה ע"ש סאקלר אוניברסיטת תל-אביב
SACKLER FACULTY OF MEDICINE TEL AVIV UNIVERSITY

Factors associated with Physicians' Decision to Request the Performance of Stool Cultures from Patients with Diarrhea

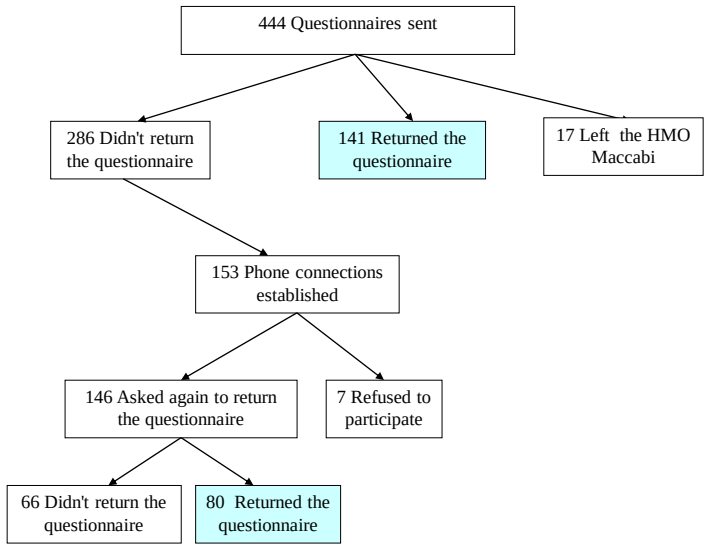
Objectives

1. To determine what proportion of physicians requests in Israel the performance of stool cultures from patients with diarrhea.
2. To determine what patient and physician-related characteristics are associated with a stool culture request.
3. To estimate and characterize biases in morbidity data based on culture-proven cases of foodborne diseases.

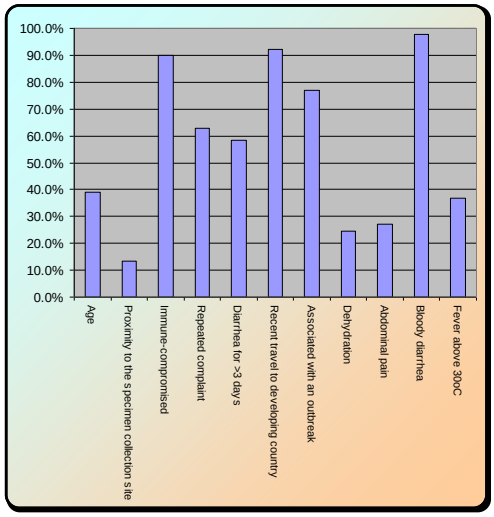
Methods

- The study was conducted in collaboration with one of the Health Maintenance Organization (H.M.O.) operating in Israel.
- We performed a survey through questionnaires distributed among pediatric physicians.

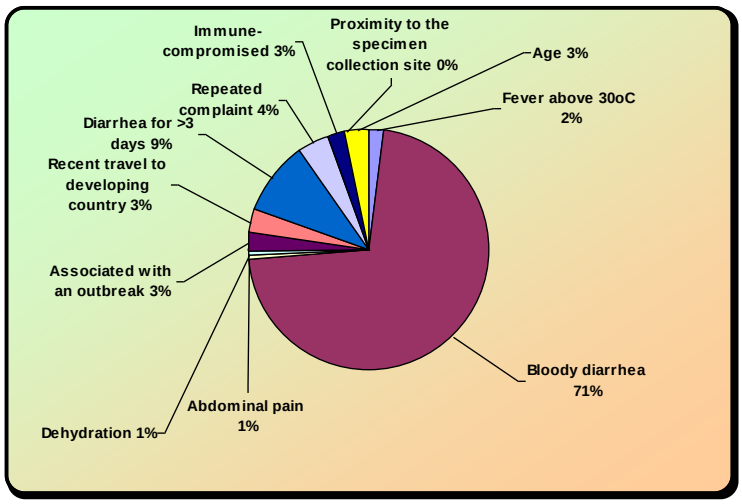
Collection of questionnaires from the physicians approached and the level of compliance



Proportion of pediatricians determined by the various factors to request a stool culture



The relative importance of various factors in the physicians' decision to order a stool culture



Risk Factors for Enteric Infections Caused by Salmonella Virchow among young children in Israel

A Matched Case Control Study

Finished, data will be shared shortly