Public health surveillance during the Athens 2004 Olympic Games, and lessons learnt

Preparing for Beijing 2008 Olympic Games:
a workshop on public health safety and emergency response
Beijing, China
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The context

- Greece:
  10.5 million population
- Athens 2004 OGs:
  - Olympic Games: 13-29 Aug
  - Paralympic Games: 15-29 Sep
- Olympic cities:
  - Athens
  - Thessaloniki
  - Heraklion (Crete)
  - Patra
  - Volos
  - (Olympia)

Surveillance in mass events

- Public health concerns
  - A large number of people in same place & same time
  - Unprecedented international travel
- BT concerns
  - Athens 2004: first summer Olympics after September 11
- International media attention
- Particular interest in past decade
  - 1996 OGs, Atlanta, USA
    (Meehan P et al, *JAMA* 1998; 279:1469-73)
  - 1998 World cup, France
    (Coulombier D, *Eurosurveillane Weekly* 1998; 2(24))
  - 2000 Euro Football, Belgium
    (Ronveaux O et al, *Eurosurveillance Weekly* 2000; 4(25))
  - 2000 OGs, Sydney, Australia
    (Thackway SV, *Med J Aust* 2000; 173:318-21)

Objectives of surveillance during the Athens Olympic Games

- Early recognition of outbreaks → response
- Early recognition of events related to deliberate release of biological or chemical agent → response
- Recognition of sporadic cases that require measures to prevent further spread of infection → response
- Evaluation of preventive measures (indirectly)

NOTE: in the Athens 2004 OG public health surveillance, only communicable diseases were included (mandate of "Centre for Infectious Disease Control"), not other relevant conditions (e.g. heat-stroke, accidents)

Main characteristics of surveillance in the Athens 2004 Olympic Games

ENHANCED OLYMPIC GAME SURVEILLANCE

- Multiple surveillance systems in operation
- In "Olympic districts" (Athens, Thessaloniki, Volos, Patra, Heraklion)
- Daily reporting
- Zero reporting
- Named person responsible for surveillance in hospitals
- Daily analysis and review of data
- Preparation of daily report

ROUTINE SURVEILLANCE SYSTEM

- Major reorganisation of surveillance system in Greece

  [From: monthly reporting perceived as bureaucratic task

  To: weekly reporting (daily in OGs) used as "tool for action"]

Surveillance systems operating in the Athens 2004 Olympic Games

- Mandatory notification system
- Laboratory reporting system
- Primary care sentinel physicians

} routine systems

- "Syndromic surveillance" from hospital outpatients
- "Syndromic surveillance" from athletic venues
- "Syndromic surveillance" from cruise ships

} ad hoc systems during OGs

- basis of OG surveillance: routine systems

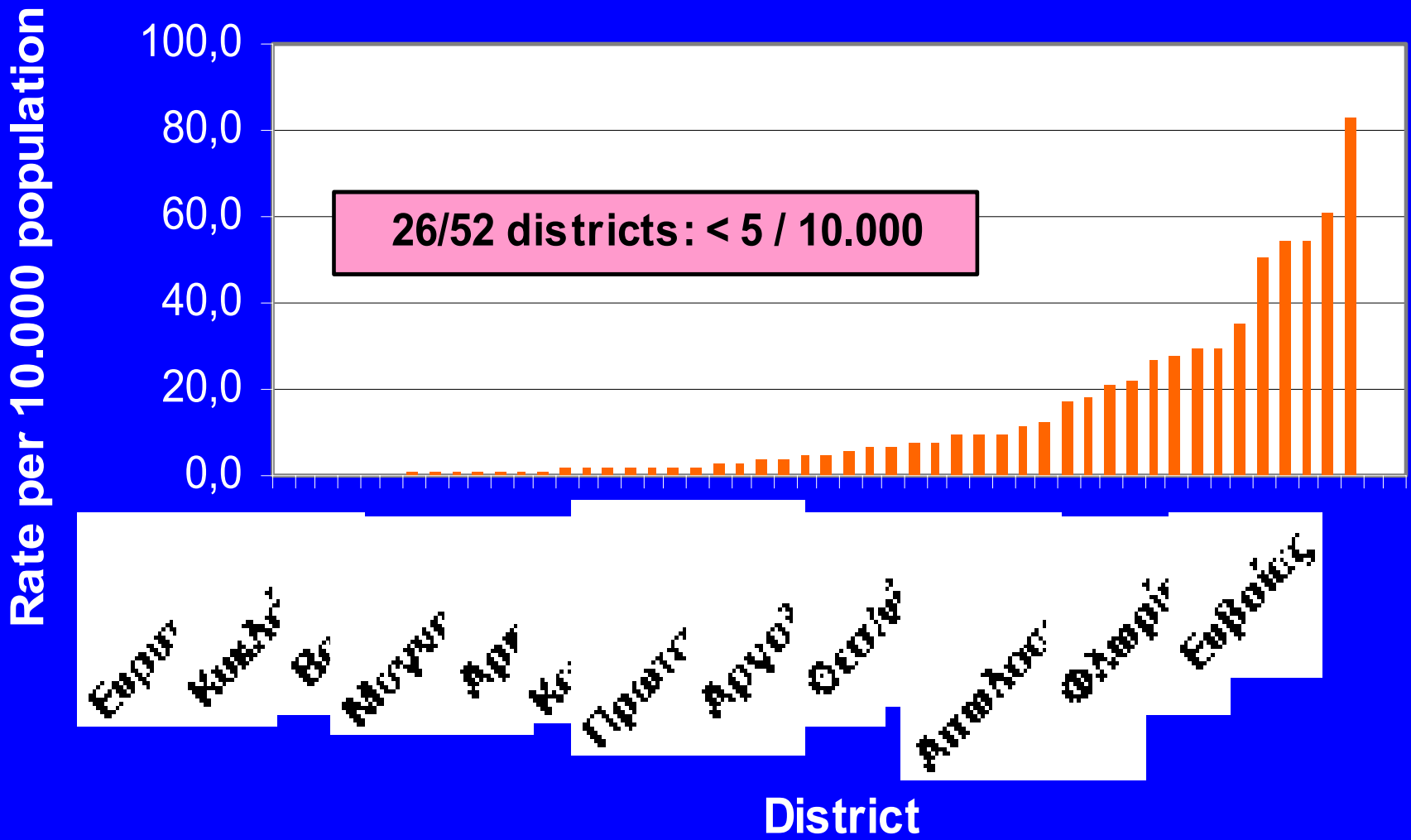
- "syndromic surveillance": focus on BT-related events

Problems of routine surveillance system (at start of preparation for Athens 2004 OGs)

- Inappropriate disease list (since 1950 with small modifications)
- Representativeness: ↓ coverage
- Data quality: ↓ completeness, **??** validity
- Timeliness: ↓ (monthly vs weekly reporting)
- Acceptability: ↓ (disrepute of system among physicans, perceived as bureaucratic task)
- Analysis and feedback: ↓ (no systematic analysis of data for long- or short-term trends or for evidence for increase of disease incidence / outbreaks)
- Integration in public health system: ↓ (often by-pass of peripheral public health authorities in disease reporting)

▶ Inappropriate approach / philosophy: NOT "information for action"

Total cases reported for all notifiable diseases, 7/1998 – 6/2000



Information reported in mandatory notification reports, Greece 7/1998 - 6/2001

	N	*%*
Reporting District	12207	**100%**
Disease	12211	**100%**
Reporting Hospital	434	**4%**
Reporting physician	131	**1%**
Surname	1850	**15%**
Name	1811	**15%**
Age	1718	**14%**
Gender	1795	**15%**
Place of residence - District	2986	**24%**
Place of residence - City / Village	1103	**9%**
Insurance No.	123	**1%**
Nationality	2991	**24%**
Date of disease onset	1001	**8%**
Type of diagnosis	1523	**12%**
Disease outcome	1001	**8%**
TOTAL REPORTED	**12212**	

Reorganisation of surveillance system and preparation for OG surveillance

- New list of diseases for surveillance and for mandatory notification – prioritisation
- Case definitions, reporting forms, protocols of public health action
- Weekly reporting (vs monthly) – “tool for action”
- Campaign to inform physicians with emphasis on “Olympic hospitals” – named person responsible for surveillance
- Large number of training courses (~30) for hospital staff of “Olympic hospitals” and public health staff in “Olympic districts”
- Dissemination of information arising from surveillance (web site, 3-monthly bulletin)
- Nomination/support of specialised labs as public health labs for 9 groups of pathogens
- Preparation of response / outbreak investigation capacity (4 teams during OGs – 2 weekly EPIET courses)

GOAL: acceptable functioning by 1/1/2004 (in “Olympic” districts)

Reorganisation of surveillance system together with preparation for OGs

- PROBLEM: no comparable background data
  ADVANTAGE: more appropriate system
  SOLUTION: short-term comparisons
- OGs: important opportunity to bring about more fundamental and lasting changes in the public health surveillance system in a country
  (goals for the day-after must be clear all the way through)

Mandatory notification (1)

Diseases to be immediately reported

- Anthrax
- Botulism
- Cholera
- Diphtheria
- Encephalitis, arbo-viral
- Haemorrhagic fever, viral
- Melioidosis/Glanders
- Plague
- Rabies
- SARS
- Smallpox
- Toularaemia

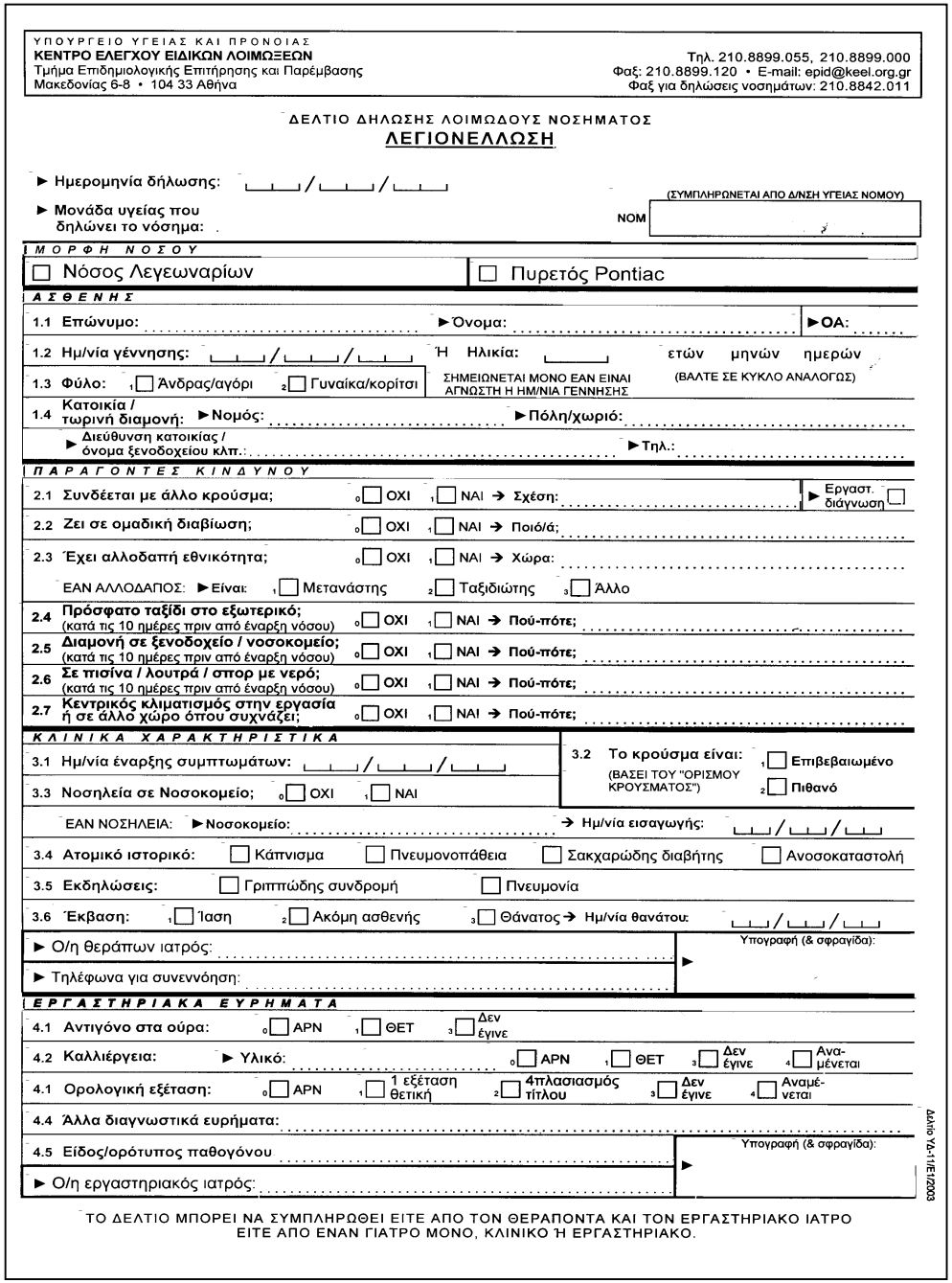
Diseases to be reported within 24 hours

- EHEC
- Hepatitis A
- Influenza, lab confirmed
- Legionellosis
- Measles, Rubella, Parotitis
- Meningitis / Menigococcal dis.
- Pertussis
- Salmonellosis (incl. typhoid / paratyphoid fever)
- Shigellosis
- Trichinosis
- Cluster of foodborne disease

Mandatory notification (2)

Diseases to be reported within the first 3 days of the week following the week of diagnosis

- Brucellosis
- Chickenpox with complications
- Congenital rubella
- Congenital syphilis
- Congenital toxoplasmosis
- Echinococcosis
- Hepatitis B, acute
- HBsAg (+) in infants < 12 mo's
- Hepatitis C, acute / confirmed anti-HCV (+), 1st diagnosis
- HIV/AIDS
- Leishmaniasis
- Leptospirosis
- Listeriosis
- Malaria
- Poliomyelitis (& AFP <15 yrs)
- Q fever, acute
- Tetanus / neonatal tetanus
- Tuberculosis
- Variant CJD (& CJD)



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ΛΕΓΙΟΝΕΛΛΩΣΗ

► Ημερομηνία δήλωσης: __/__/__

► Μονάδα υγείας που δηλώνει το νόσημα:

(ΣΥΜΠΛΗΡΩΝΕΤΑΙ ΑΠΟ Δ/ΝΣΗ ΥΓΕΙΑΣ ΝΟΜΟΥ) ΝΟΜ

ΜΟΡΦΗ ΝΟΣΟΥ

☐ Νόσος Λεγεωναρίων ☐ Πυρετός Pontiac

ΑΣΘΕΝΗΣ

1.1 Επώνυμο: ► Όνομα: ► ΟΑ:

1.2 Ημ/νία γέννησης: __/__/__ Ή Ηλικία: ετών μηνών ημερών

1.3 Φύλο: 1☐ Άνδρας/αγόρι 2☐ Γυναίκα/κορίτσι (ΣΗΜΕΙΩΝΕΤΑΙ ΜΟΝΟ ΕΑΝ ΕΙΝΑΙ ΑΓΝΩΣΤΗ Η ΗΜ/ΝΙΑ ΓΕΝΝΗΣΗΣ) (ΒΑΛΤΕ ΣΕ ΚΥΚΛΟ ΑΝΑΛΟΓΩΣ)

1.4 Κατοικία / τωρινή διαμονή: ► Νομός: ► Πόλη/χωριό:

► Διεύθυνση κατοικίας / όνομα ξενοδοχείου κλπ.: ► Τηλ.:

ΠΑΡΑΓΟΝΤΕΣ ΚΙΝΔΥΝΟΥ

2.1 Συνδέεται με άλλο κρούσμα; 0☐ ΟΧΙ 1☐ ΝΑΙ → Σχέση: ► Εργαστ. διάγνωση ☐

2.2 Ζει σε ομαδική διαβίωση; 0☐ ΟΧΙ 1☐ ΝΑΙ → Ποιό/ά:

2.3 Έχει αλλοδαπή εθνικότητα; 0☐ ΟΧΙ 1☐ ΝΑΙ → Χώρα:

ΕΑΝ ΑΛΛΟΔΑΠΟΣ: ►Είναι: 1☐ Μετανάστης 2☐ Ταξιδιώτης 3☐ Άλλο

2.4 **Πρόσφατο ταξίδι στο εξωτερικό;** (κατά τις 10 ημέρες πριν από έναρξη νόσου) 0☐ ΟΧΙ 1☐ ΝΑΙ → **Πού-πότε;**

2.5 **Διαμονή σε ξενοδοχείο / νοσοκομείο;** (κατά τις 10 ημέρες πριν από έναρξη νόσου) 0☐ ΟΧΙ 1☐ ΝΑΙ → **Πού-πότε;**

2.6 **Σε πισίνα / λουτρά / σπορ με νερό;** (κατά τις 10 ημέρες πριν από έναρξη νόσου) 0☐ ΟΧΙ 1☐ ΝΑΙ → **Πού-πότε;**

2.7 **Κεντρικός κλιματισμός στην εργασία ή σε άλλο χώρο όπου συχνάζει;** 0☐ ΟΧΙ 1☐ ΝΑΙ → **Πού-πότε;**

ΚΛΙΝΙΚΑ ΧΑΡΑΚΤΗΡΙΣΤΙΚΑ

3.1 Ημ/νία έναρξης συμπτωμάτων: __/__/__

3.2 Το κρούσμα είναι: (ΒΑΣΕΙ ΤΟΥ "ΟΡΙΣΜΟΥ ΚΡΟΥΣΜΑΤΟΣ") 1☐ Επιβεβαιωμένο 2☐ Πιθανό

3.3 Νοσηλεία σε Νοσοκομείο; 0☐ ΟΧΙ 1☐ ΝΑΙ

ΕΑΝ ΝΟΣΗΛΕΙΑ: ►Νοσοκομείο: → Ημ/νία εισαγωγής: __/__/__

3.4 Ατομικό ιστορικό: ☐ Κάπνισμα ☐ Πνευμονοπάθεια ☐ Σακχαρώδης διαβήτης ☐ Ανοσοκαταστολή

3.5 Εκδηλώσεις: ☐ Γριππώδης συνδρομή ☐ Πνευμονία

3.6 Έκβαση: 1☐ Ίαση 2☐ Ακόμη ασθενής 3☐ Θάνατος → Ημ/νία θανάτου: __/__/__

► Ο/η θεράπων ιατρός: Υπογραφή (& σφραγίδα): ►

► Τηλέφωνα για συνεννόηση:

ΕΡΓΑΣΤΗΡΙΑΚΑ ΕΥΡΗΜΑΤΑ

4.1 Αντιγόνο στα ούρα: 0☐ ΑΡΝ 1☐ ΘΕΤ 3☐ Δεν έγινε

4.2 Καλλιέργεια: ► Υλικό: 0☐ ΑΡΝ 1☐ ΘΕΤ 3☐ Δεν έγινε 4☐ Αναμένεται

4.1 Ορολογική εξέταση: 0☐ ΑΡΝ 1☐ 1 εξέταση θετική 2☐ 4πλασιασμός τίτλου 3☐ Δεν έγινε 4☐ Αναμένεται

4.4 Άλλα διαγνωστικά ευρήματα:

4.5 Είδος/ορότυπος παθογόνου Υπογραφή (& σφραγίδα): ►

► Ο/η εργαστηριακός ιατρός:

ΤΟ ΔΕΛΤΙΟ ΜΠΟΡΕΙ ΝΑ ΣΥΜΠΛΗΡΩΘΕΙ ΕΙΤΕ ΑΠΟ ΤΟΝ ΘΕΡΑΠΟΝΤΑ ΚΑΙ ΤΟΝ ΕΡΓΑΣΤΗΡΙΑΚΟ ΙΑΤΡΟ ΕΙΤΕ ΑΠΟ ΕΝΑΝ ΓΙΑΤΡΟ ΜΟΝΟ, ΚΛΙΝΙΚΟ Ή ΕΡΓΑΣΤΗΡΙΑΚΟ.

Δελτίο ΥΔ-11ΕΠ/2003

New reporting forms

- different for each disease or group of diseses
- 18 forms on the whole
- focus on risk factors for which intervention is necessary

Mandatory notification system reporting form

Primary care sentinel physician system
"Syndromic" surveillance / hospital emergency

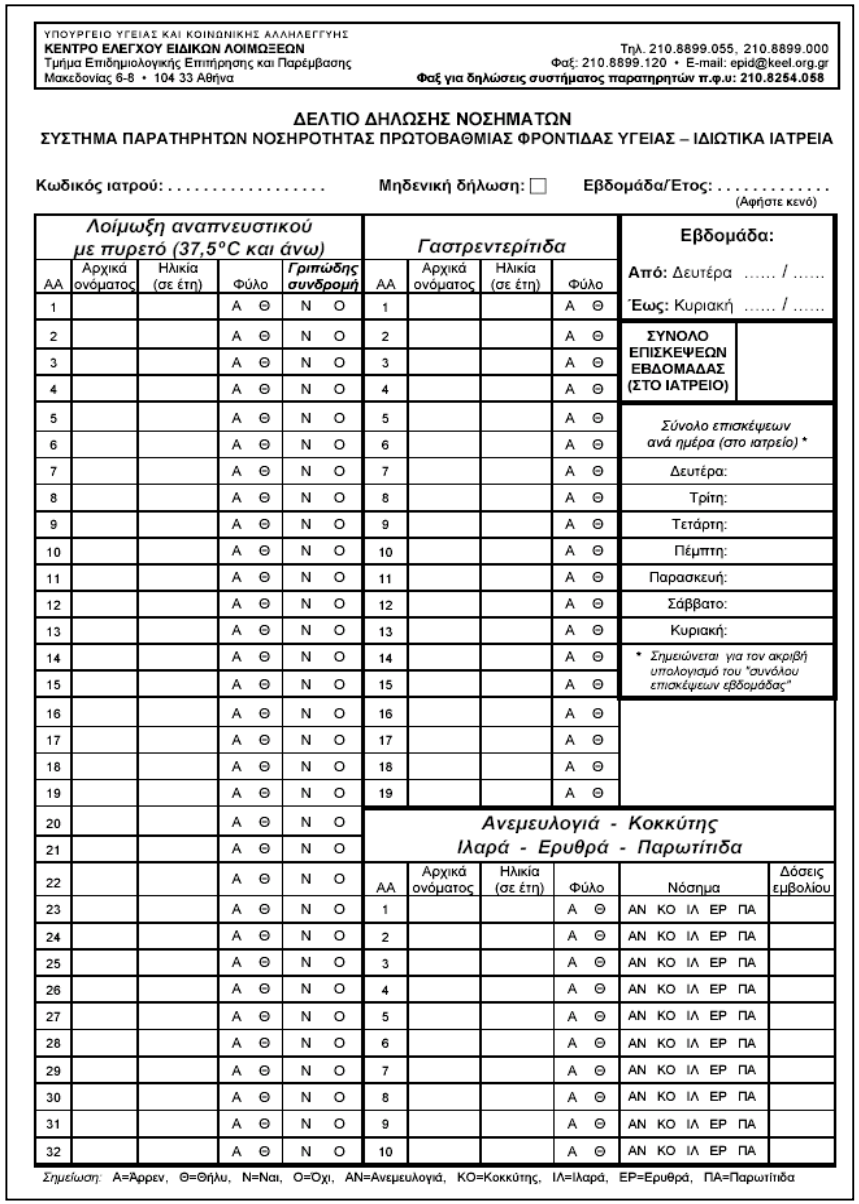
Sentinel physician system

- Respiratory infection
- Influenza-like illness
- Gastroenteritis
- Chickenpox
- Measles
- Rubella
- Parotitis
- Pertussis

Hospital outpatients, athletic venues and cruise ships - syndromic *

- Respiratory infection with fever
- Bloody diarrhoea
- Gastroenteritis (no blood in stool)
- Rash with fever
- Meningitis, encephalitis
- Acute viral hepatitis suspected
- Symptoms compatible with botulism
- Lemphadenopathy with fever
- Septic or unexplained shock
- Unexplained death with history of fever
- Other syndrome of public health interest

* Only for OGs



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ΣΥΣΤΗΜΑ ΠΑΡΑΤΗΡΗΤΩΝ ΝΟΣΗΡΟΤΗΤΑΣ ΠΡΩΤΟΒΑΘΜΙΑΣ ΦΡΟΝΤΙΔΑΣ ΥΓΕΙΑΣ – ΙΔΙΩΤΙΚΑ ΙΑΤΡΕΙΑ

Κωδικός ιατρού: . . . . . **Μηδενική δήλωση:** ☐ **Εβδομάδα/Έτος:** . . . . . (Αφήστε κενό)

Λοίμωξη αναπνευστικού με πυρετό (37,5°C και άνω)

ΑΑ	Αρχικά ονόματος	Ηλικία (σε έτη)	Φύλο	*Γριπώδης συνδρομή*
1			Α Θ	Ν Ο
2			Α Θ	Ν Ο
3			Α Θ	Ν Ο
4			Α Θ	Ν Ο
5			Α Θ	Ν Ο
6			Α Θ	Ν Ο
7			Α Θ	Ν Ο
8			Α Θ	Ν Ο
9			Α Θ	Ν Ο
10			Α Θ	Ν Ο
11			Α Θ	Ν Ο
12			Α Θ	Ν Ο
13			Α Θ	Ν Ο
14			Α Θ	Ν Ο
15			Α Θ	Ν Ο
16			Α Θ	Ν Ο
17			Α Θ	Ν Ο
18			Α Θ	Ν Ο
19			Α Θ	Ν Ο
20			Α Θ	Ν Ο
21			Α Θ	Ν Ο
22			Α Θ	Ν Ο
23			Α Θ	Ν Ο
24			Α Θ	Ν Ο
25			Α Θ	Ν Ο
26			Α Θ	Ν Ο
27			Α Θ	Ν Ο
28			Α Θ	Ν Ο
29			Α Θ	Ν Ο
30			Α Θ	Ν Ο
31			Α Θ	Ν Ο
32			Α Θ	Ν Ο

Γαστρεντερίτιδα

ΑΑ	Αρχικά ονόματος	Ηλικία (σε έτη)	Φύλο
1			Α Θ
2			Α Θ
3			Α Θ
4			Α Θ
5			Α Θ
6			Α Θ
7			Α Θ
8			Α Θ
9			Α Θ
10			Α Θ
11			Α Θ
12			Α Θ
13			Α Θ
14			Α Θ
15			Α Θ
16			Α Θ
17			Α Θ
18			Α Θ
19			Α Θ

Εβδομάδα:

Από: Δευτέρα ..... / .....

Έως: Κυριακή ..... / .....

ΣΥΝΟΛΟ ΕΠΙΣΚΕΨΕΩΝ ΕΒΔΟΜΑΔΑΣ (ΣΤΟ ΙΑΤΡΕΙΟ)	

Σύνολο επισκέψεων ανά ημέρα (στο ιατρείο) *

Δευτέρα:	
Τρίτη:	
Τετάρτη:	
Πέμπτη:	
Παρασκευή:	
Σάββατο:	
Κυριακή:	

* *Σημειώνεται για τον ακριβή υπολογισμό του "συνόλου επισκέψεων εβδομάδας"*

Ανεμευλογιά - Κοκκύτης
Ιλαρά - Ερυθρά - Παρωτίτιδα

ΑΑ	Αρχικά ονόματος	Ηλικία (σε έτη)	Φύλο	Νόσημα	Δόσεις εμβολίου
1			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
2			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
3			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
4			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
5			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
6			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
7			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
8			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
9			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	
10			Α Θ	ΑΝ ΚΟ ΙΛ ΕΡ ΠΑ	

Σημείωση: Α=Άρρεν, Θ=Θήλυ, Ν=Ναι, Ο=Όχι, ΑΝ=Ανεμευλογιά, ΚΟ=Κοκκύτης, ΙΛ=Ιλαρά, ΕΡ=Ερυθρά, ΠΑ=Παρωτίτιδα

Primary care sentinel physician system reporting form

Laboratory notification

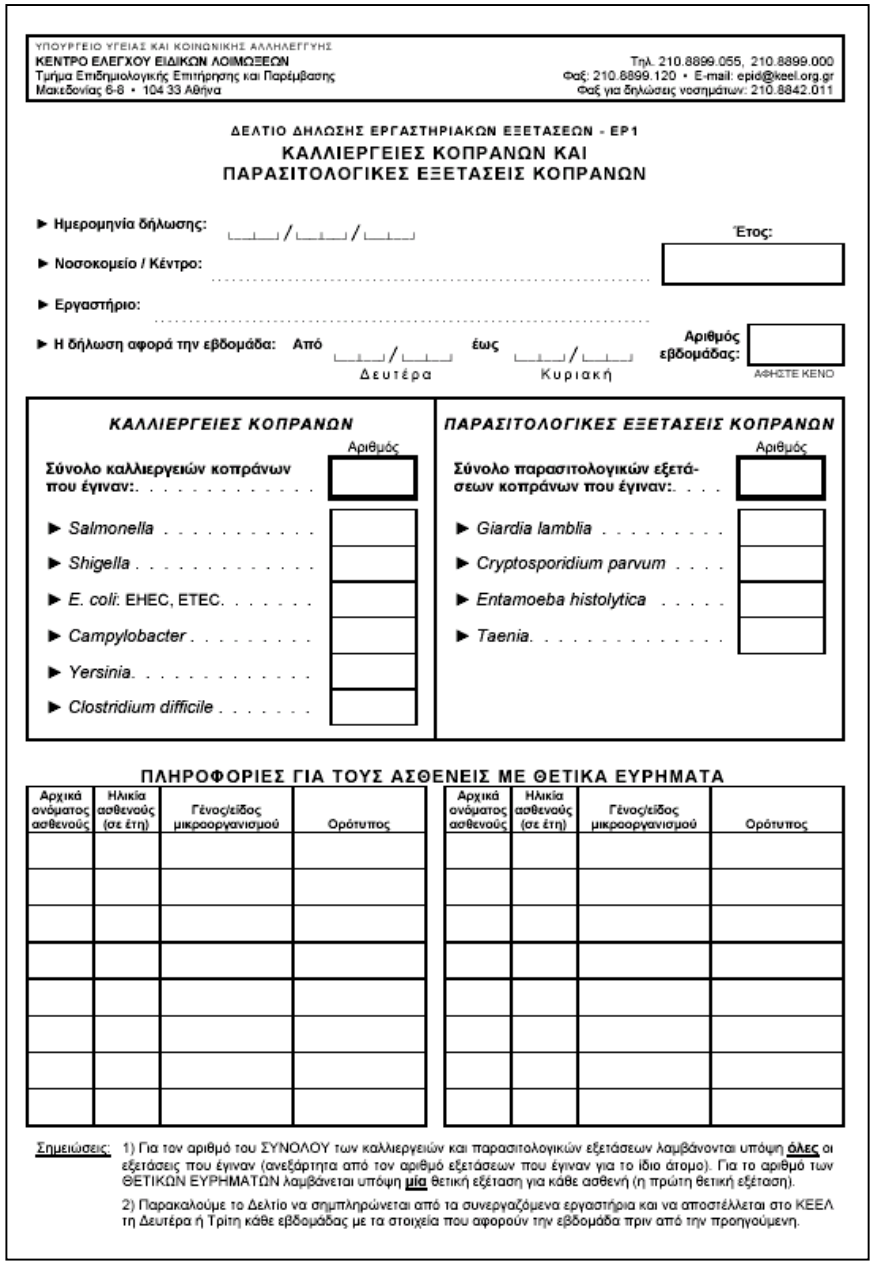
Stool culture results

- Salmonella
- Shigella
- E. coli: EHEC, ETEC
- Campylobacter
- Yersinia
- Clostridium difficile
- Giardia lamblia
- Cryptosporidium parvum
- Entamoeba histolytica
- Taenia

Results of serological tests *

- Adenovirus
- RSV
- Influenza virus
- Parainfluenza virus
- Echo virus
- Coxsackie virus
- Noro-virus
- Rota virus
- Haemophilus influenzae b
- S. pneumoniae
- Streptococcus, group A
- Mycoplasma pneumoniae

* Only for OGs (rom 15 hospital labs)



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ΚΑΛΛΙΕΡΓΕΙΕΣ ΚΟΠΡΑΝΩΝ ΚΑΙ ΠΑΡΑΣΙΤΟΛΟΓΙΚΕΣ ΕΞΕΤΑΣΕΙΣ ΚΟΠΡΑΝΩΝ

► Ημερομηνία δήλωσης: __/__/__ Έτος:

► Νοσοκομείο / Κέντρο: .....

► Εργαστήριο: .....

► Η δήλωση αφορά την εβδομάδα: Από __/__ (Δευτέρα) έως __/__ (Κυριακή) Αριθμός εβδομάδας: (ΑΦΗΣΤΕ ΚΕΝΟ)

ΚΑΛΛΙΕΡΓΕΙΕΣ ΚΟΠΡΑΝΩΝ

	Αριθμός
Σύνολο καλλιεργειών κοπράνων που έγιναν:	
► *Salmonella*	
► *Shigella*	
► *E. coli*: EHEC, ETEC	
► *Campylobacter*	
► *Yersinia*	
► *Clostridium difficile*	

ΠΑΡΑΣΙΤΟΛΟΓΙΚΕΣ ΕΞΕΤΑΣΕΙΣ ΚΟΠΡΑΝΩΝ

	Αριθμός
Σύνολο παρασιτολογικών εξετάσεων κοπράνων που έγιναν:	
► *Giardia lamblia*	
► *Cryptosporidium parvum*	
► *Entamoeba histolytica*	
► *Taenia*	

ΠΛΗΡΟΦΟΡΙΕΣ ΓΙΑ ΤΟΥΣ ΑΣΘΕΝΕΙΣ ΜΕ ΘΕΤΙΚΑ ΕΥΡΗΜΑΤΑ

Αρχικά ονόματος ασθενούς	Ηλικία ασθενούς (σε έτη)	Γένος/είδος μικροοργανισμού	Ορότυπος	Αρχικά ονόματος ασθενούς	Ηλικία ασθενούς (σε έτη)	Γένος/είδος μικροοργανισμού	Ορότυπος

Σημειώσεις: 1) Για τον αριθμό του ΣΥΝΟΛΟΥ των καλλιεργειών και παρασιτολογικών εξετάσεων λαμβάνονται υπόψη **όλες** οι εξετάσεις που έγιναν (ανεξάρτητα από τον αριθμό εξετάσεων που έγιναν για το ίδιο άτομο). Για το αριθμό των ΘΕΤΙΚΩΝ ΕΥΡΗΜΑΤΩΝ λαμβάνεται υπόψη **μία** θετική εξέταση για κάθε ασθενή (η πρώτη θετική εξέταση).

2) Παρακαλούμε το Δελτίο να σημπληρώνεται από τα συνεργαζόμενα εργαστήρια και να αποστέλλεται στο ΚΕΕΛ τη Δευτέρα ή Τρίτη κάθε εβδομάδας με τα στοιχεία που αφορούν την εβδομάδα πριν από την προηγούμενη.

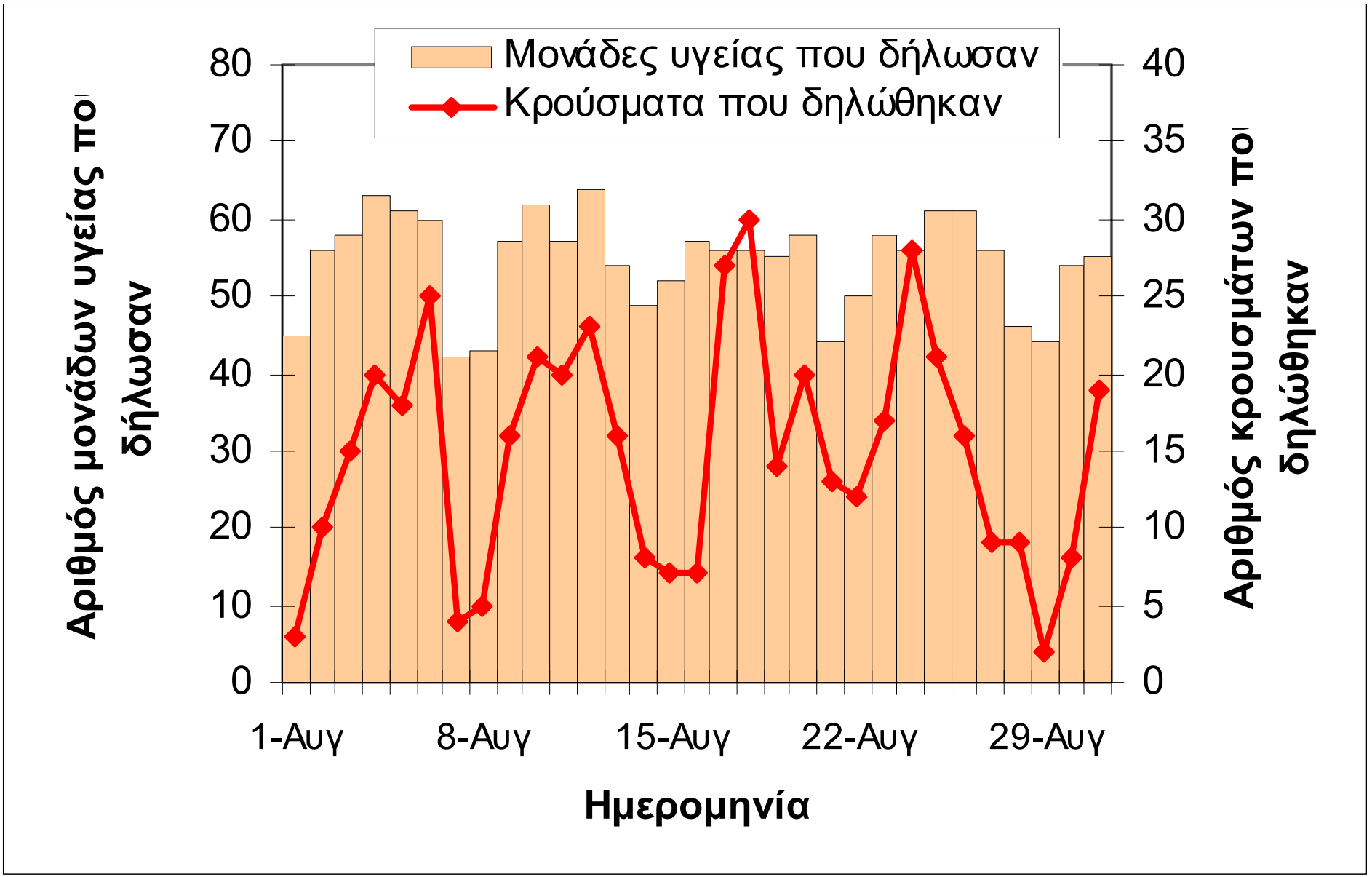
Laboratory system reporting form

Surveillance systems operating in the Athens 2004 Olympic Games

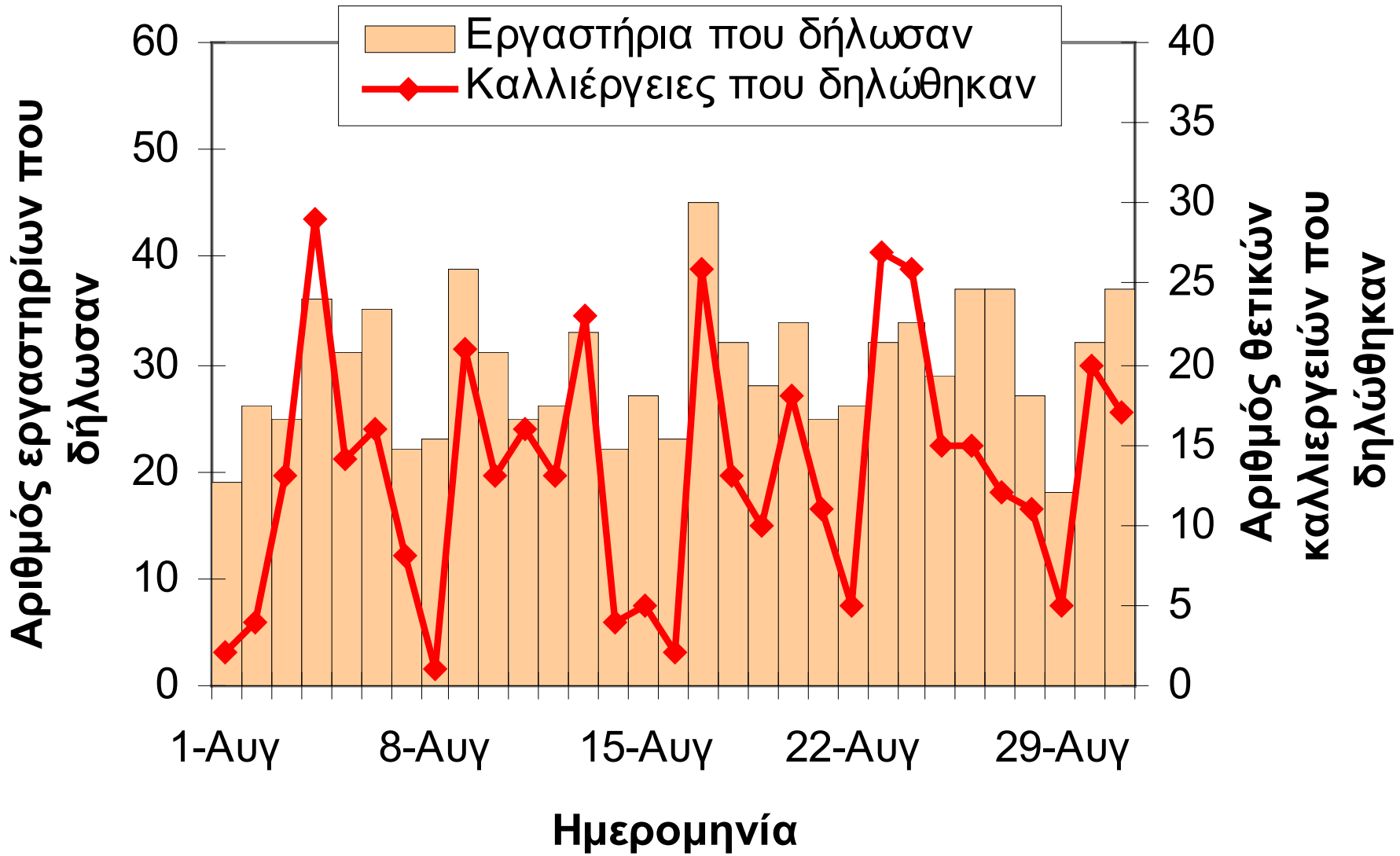
	Health units or physicians in enhanced surveillance - daily reporting
• Mandatory notification system	69
• Laboratory reporting system	65
• Primary care sentinel physicians	49 *
• "Syndromic surveillance" from hospital outpatients	31 (daily: 10-17)
• "Syndromic surveillance" from athletic venues	200 (daily: 30-120)
• "Syndromic surveillance" from cruise ships	10

* physicians

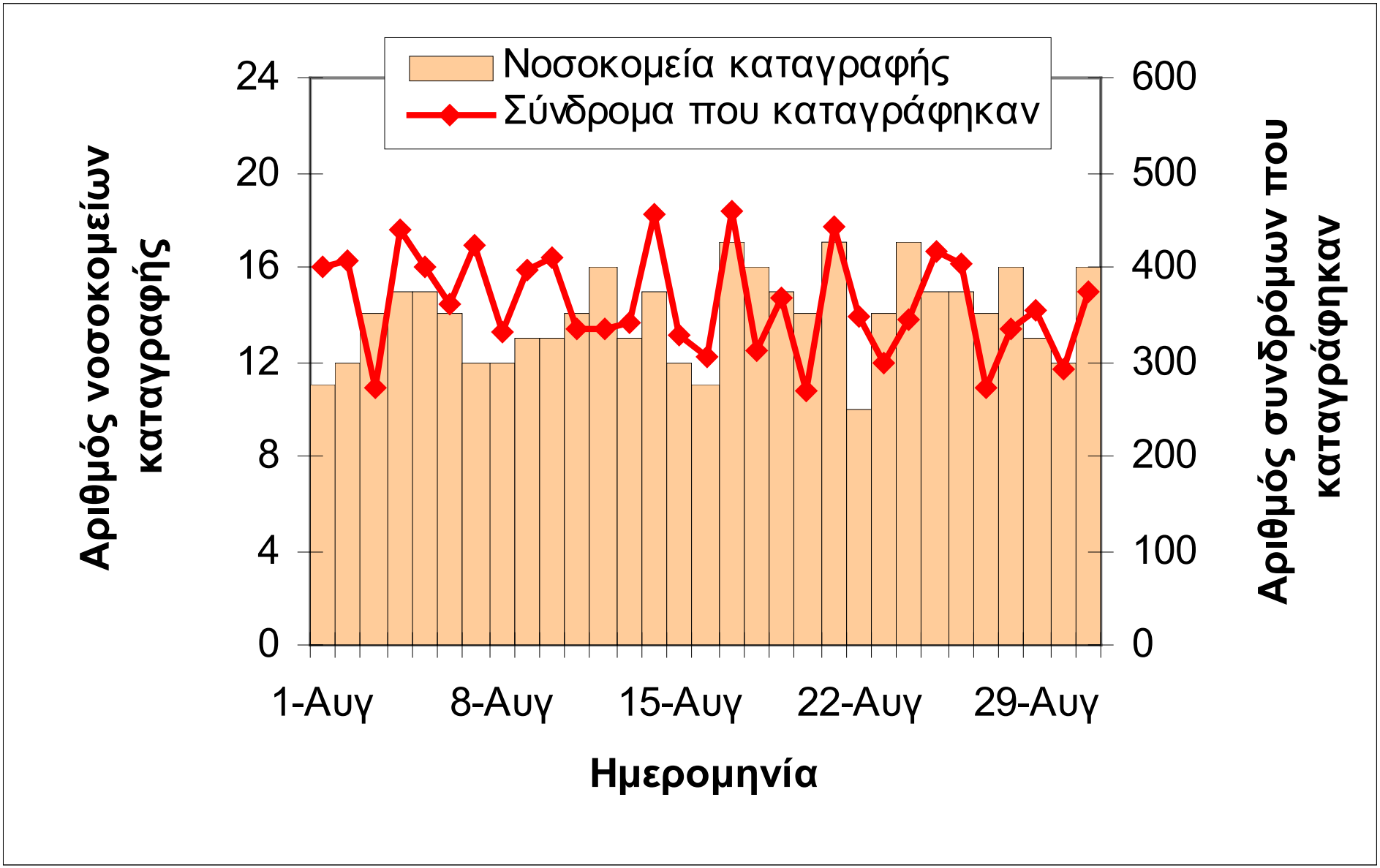
Mandatory notification, health units reporting and cases reported, 1-31 August 2004



Stool culture notifications, health units reporting and cases reported, 1-31 August 2004



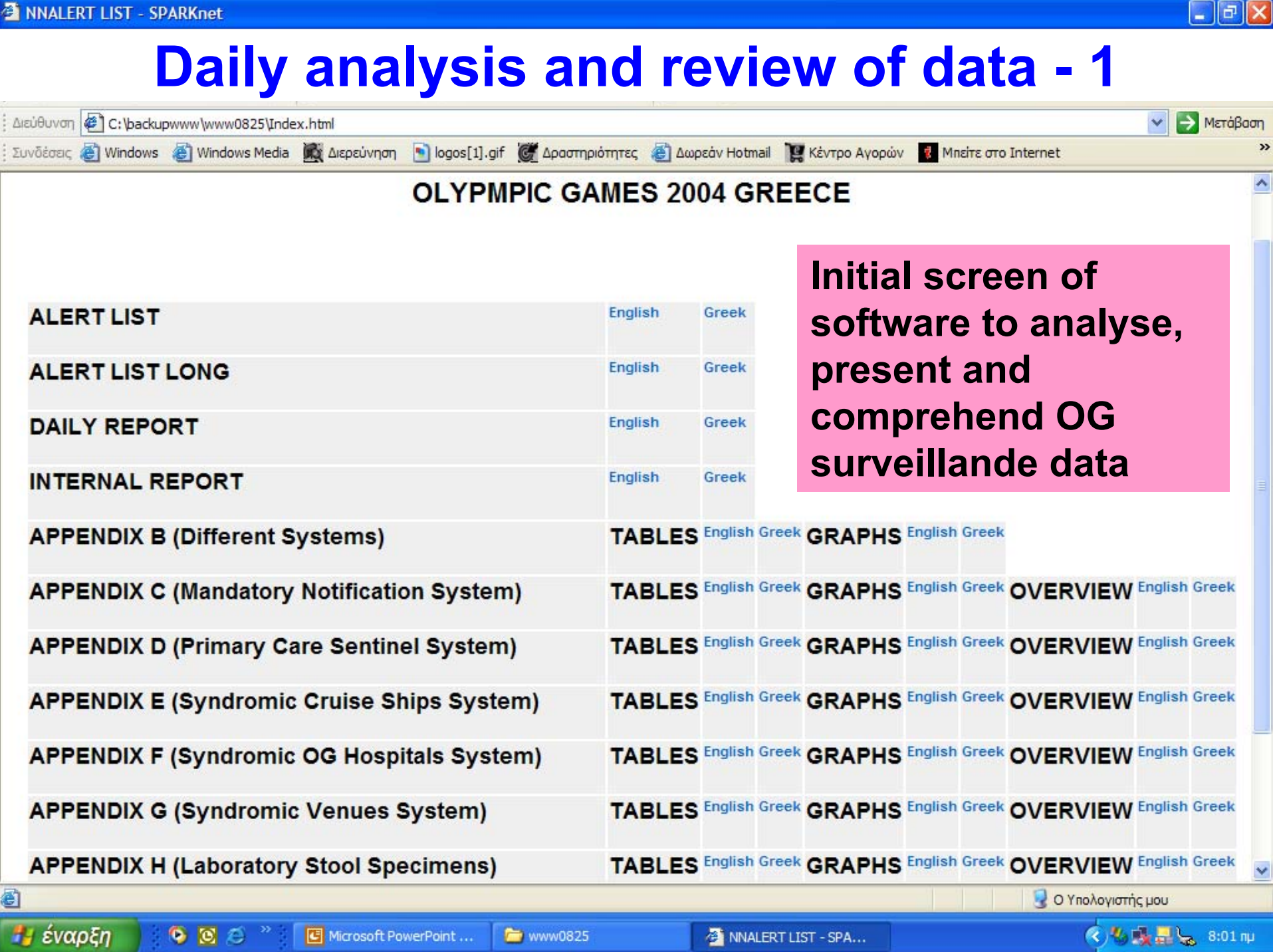
Outpatient syndromic notifications, health units reporting and cases reported, 1-31 August 2004



Software for analysis

- Need for software to analyse, present and comprehend large amount of data (on a daily basis), and prepare a daily report
- Need for “alerts” for numbers reported in excess of expected
- Close collaboration with WHO/CSR/EPS-Lyon to produce suitable software (based on statistical package “R” [freeware], tailored to OG needs)

Daily analysis and review of data - 1



Daily analysis and review of data - 2

Daily Report of Epidemiological Surveillance - SPARKnet

Διεύθυνση C:\backupwww\www0825\WWW_EN\Report_EN.html Μετάβαση

Συνδέσεις Windows Windows Media Διερεύνηση logos[1].gif Δραστηριότητες Δωρεάν Hotmail Κέντρο Αγορών Μπείτε στο Internet

daily report (produced automatically)

BUT not made public or sent to data providers

Hellenic Centre for Infectious Disease Control

MINISTRY OF HEALTH AND SOCIAL SOLIDARITY

Hellenic Centre for Infectious Disease Control (KEEL)

Daily Report of Epidemiological Surveillance

Olympic Games 2004 - Athens

2004-08-25

In this report, a brief description of notifications for selected diseases in the Greek "Olympic districts" is presented, based on several enhanced surveillance systems in operation. Reports of 2004-08-25 include those that were received at KEEL between 13.00 of 2004-08-24 and 13.00 of 2004-08-25 .
In summary, on this report day, the occurrence of all reported diseases in the "Olympic districts" is within the expected range and no cluster of cases or outbreak was reported.

1. Respiratory infection

Table 1. Notifications for Respiratory Infections by Surveillance System

	Surveillance System	2004-08-25		pre7d		cumul	
		n	%vis	mean	%vis	n	%vis
Respiratory infection	Primary care sentinel *	12	6.1	8.6	5.5	225	6.3

Ολοκληρώθηκε Ο Υπολογιστής μου

έναρξη Microsoft PowerPoint ... www0825 Daily Report of Epide... 8:06 πμ

Daily analysis and review of data - 3

APPENDIX B

Notifications for selected diseases from different surveillance systems

All "Olympic" districts - 2004-08-24

Table 1. Notifications for Respiratory Infections by Surveillance System

			Surveillance System	2004-08-24		pre7d		cumul		Statistical Tests	
				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Respiratory infection	Primary care sentinel	11	5.0	9.2	6.2	762	8.0	0.317974	0.794195
PIC	IMG	Respiratory infection	Syndromic - OG Hospitals	163	4.3	167.3	3.8	11091	4.2	0.640143	0.072889
PIC	IMG	Influenza-like illness	Primary care sentinel	0	0.0	1.0	0.7	64	0.7	1.000000	1.000000

Table 2. Notifications for gastroenteritis by reporting system

			Surveillance System	2004-08-24		pre7d		cumul		Statistical Tests	
				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Gastroenteritis	Primary care sentinel	17	7.8	6.0	4.0	333	3.5	**0.000175**	**0.007590**
PIC	IMG	Gastroenteritis	Syndromic - OG Hospitals	149	3.9	155.0	3.6	9106	3.4	0.695784	0.110504
PIC	IMG	Bloody diarrhoea	Syndromic - OG Hospitals	3	0.1	5.7	0.1	275	0.1	0.924000	0.871943
PIC	IMG	Foodborne outbreaks	Mandatory notification	0	0.0	0.9	4.5	29	3.0	1.000000	1.000000
PIC	IMG	Salmonellosis	Mandatory notification	25	89.3	8.7	45.9	495	51.6	**0.000005**	**0.000002**

Table 3. Notifications for meningitis by reporting system

			Surveillance System	2004-08-24		pre7d		cumul		Statistical Tests	
				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Meningitis	Syndromic - OG Hospitals	4	0.1	4.7	0.1	273	0.1	0.692559	0.584110

Daily analysis and review of data - 3

APPENDIX B

Notifications for selected diseases from different surveillance systems

All "Olympic" districts - 2004-08-24

Table 1. Notifications for Respiratory Infections by Surveillance System

			Surveillance System	2004-08-24		pre7d		cumul		Statistical Tests	
				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Respiratory infection	Primary care sentinel	11	5.0	9.2	6.2	762	8.0	0.317974	0.794195
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				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Meningitis	Syndromic - OG Hospitals	4	0.1	4.7	0.1	273	0.1	0.692559	0.584110

Daily analysis and review of data - 3

APPENDIX B

Notifications for selected diseases from different surveillance systems

All "Olympic" districts - 2004-08-24

Table 1. Notifications for Respiratory Infections by Surveillance System

			Surveillance System	2004-08-24		pre7d		cumul		Statistical Tests	
				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
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PIC	IMG	Respiratory infection	Syndromic - OG Hospitals	[illegible]	[illegible]	167.3	3.8	11091	4.2	0.640143	0.072889
PIC	IMG	Influenza-like illness	Primary care sentinel	0	0.0	1.0	0.7	64	0.7	1.000000	1.000000

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Daily analysis and review of data - 3

APPENDIX B

Notifications for selected diseases from different surveillance systems

All "Olympic" districts - 2004-08-24

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PIC	IMG	Bloody diarrhoea	Syndromic - OG Hospitals	3	0.1	5.7	0.1	275	0.1	0.924000	0.871943
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Daily analysis and review of data - 3

APPENDIX B

Notifications for selected diseases from different surveillance systems

All "Olympic" districts - 2004-08-24

Table 1. Notifications for Respiratory Infections by Surveillance System

			Surveillance System	2004-08-24		pre7d		cumul		Statistical Tests	
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PIC	IMG	Influenza-like illness	Primary care sentinel	0	0.0	1.0	0.7	64	0.7	1.000000	1.000000

Table 2. Notifications for gastroenteritis by reporting system

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Table 3. Notifications for meningitis by reporting system

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				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Meningitis	Syndromic - OG Hospitals	4	0.1	4.7	0.1	273	0.1	0.692559	0.584110

Daily analysis and review of data - 3

APPENDIX B

Comparison:

of daily data
with previous 7 days

for each disease/syndrome
and district

using the Poisson test for counts
the binomial test for proportions

at the 99% significance level and
the 95% significance level

om different surveillance systems

cts - 2004-08-24

stem

2004-08-24		pre7d		cumul		Statistical Tests	
n	%vis	mean	%vis	n	%vi	Poisson	Binomial
11	5.0	9.2	6.2	762	8.0	0.317974	0.794195
163	4.3	167.3	3.8	11091	4.2	0.640143	0.07
0	0.0	1.0	0.7	64	0.7	1.000000	1.000000

				2004-08-24		pre7d		cumul		Statistical Tests	
				n	%vis	mean	%vis	n	%vis	Poisson	Binomial
				17	7.8	6.0	4.0	333	3.5	0.000175	0.007590
				149	3.9	155.0	3.6	9106	3.4	0.695784	0.110504
PIC	IMG	Bloody diarrhoea	Syndromic - OG Hospitals	3	0.1	5.7	0.1	275	0.1	0.924000	0.871943
PIC	IMG	Foodborne outbreaks	Mandatory notification	0	0.0	0.9	4.5	29	3.0	1.000000	1.000000
PIC	IMG	Salmonellosis	Mandatory notification	25	89.3	8.7	45.9	495	51.6	0.000005	0.000002

(Syndromic surveillance from hospital outpatients: time series analysis taking into account data from previous years)

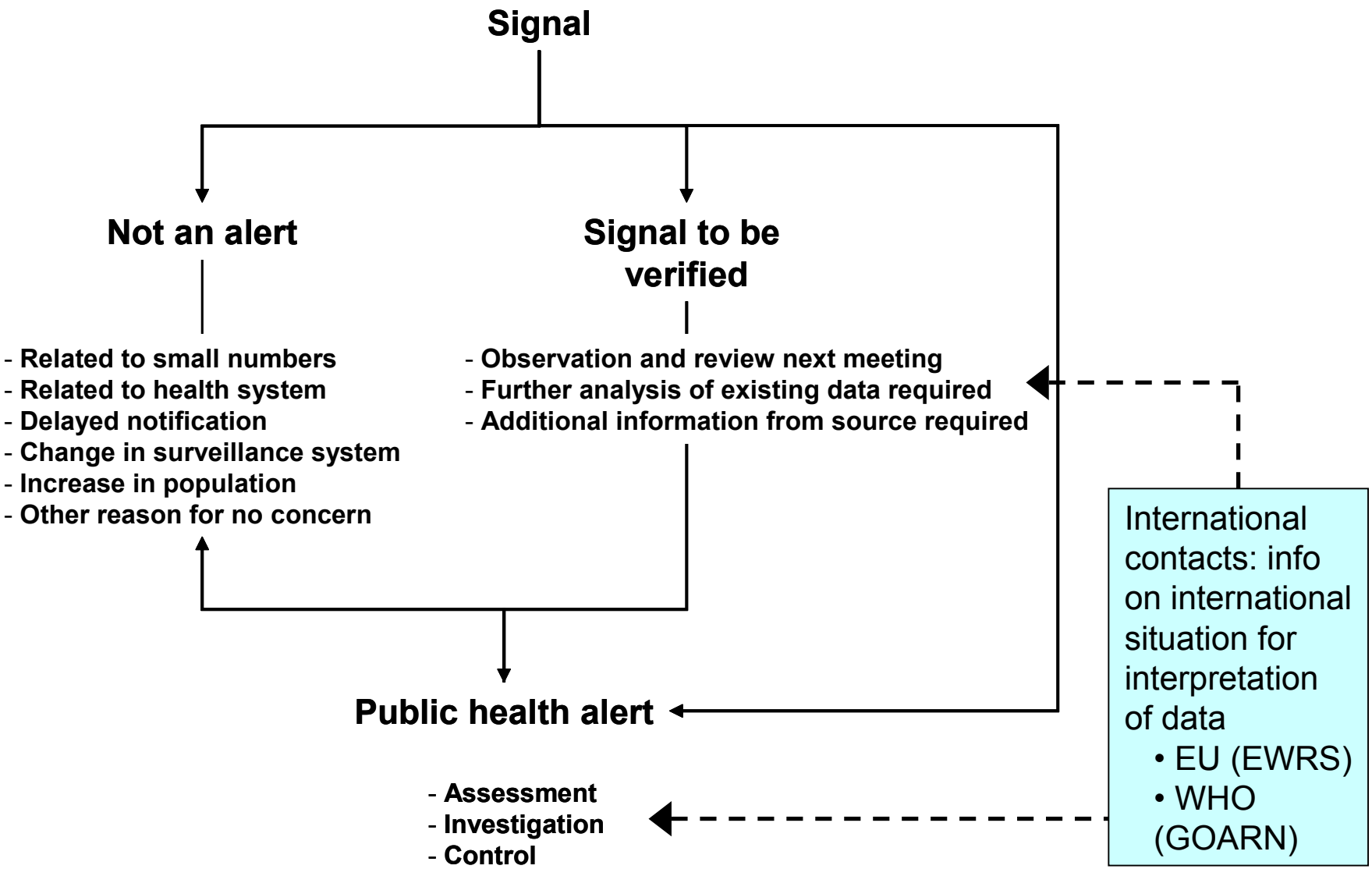
Statistical signals from enhanced OG surveillance, 1-31 August 2004

	Number of statistical signals
• Mandatory notification system	82
• Primary care sentinel physicians	9
• Laboratory reporting system	90
• "Syndromic surveillance" from hospital outpatients	166
• "Syndromic surveillance" from athletic venues	15
• "Syndromic surveillance" from cruise ships	30
TOTAL	**392**

Translating statistical significance into public health significance

The 3.00 pm daily surveillance meeting

Operational procedures to deal with statistical signals



Operational procedures to deal with single cases

SINGLE CASES RELATED TO OGs

- All reported cases of communicable diseases related to OGs: further epidemiological investigation to establish risk of outbreak and take control measures
- Responsibility of "Olympic surveillance" team
  → need for numerous personnel

SINGLE CASES FROM "SYNDROMIC" SYSTEMS

- Follow-up of cases to get info on final diagnosis (to rule out the possibility of a BT event)
- KEEL staff in hospitals, cruise ships, athletic venues
  → very demanding in terms of personnel
  → reassuring that no evidence on BT related event

No major public health event
in the Athens 2004 Olympic Games

Focus on the most significant statistical signal from the surveillance system in place (cluster of related signals, 24-25 August)

24 Aug 1

Attiki

Primary care sentinel system,

Gastroenteritis

APPENDIX D

Notifications in primary care sentinel physician system

Attiki - 2004-08-24

Total visits reported :218

			2004-08-24		pre7d		cumul		Statistical Tests	
			n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Respiratory infection	11	5.0	9.2	6.2	762	8.0	0.317974	0.794195
PIC	IMG	Influenza-like illness	[illegible]	0.0	1.0	0.7	64	0.7	1.000000	1.000000
PIC	IMG	Gastroenteritis	17	7.8	6.0	4.0	333	3[illegible]	**0.000175**	**0.007590**
PIC	IMG	Chickenpox	[illegible]	0.0	0.2	0.1	19	0.2	1.000000	1.000000
PIC	IMG	Pertussis	0	0.0	0.0	0.0	0	0.0	1.000000	1.000000
PIC	IMG	Measles	0	0.0	0.0	0.0	0	0.0	1.000000	1.000000
PIC	IMG	Rubella	0	0.0	0.0	0.0	1	0.0	1.000000	1.000000
PIC	IMG	Mumps	0	0.0	0.0	0.0	0	0.0	1.000000	1.000000

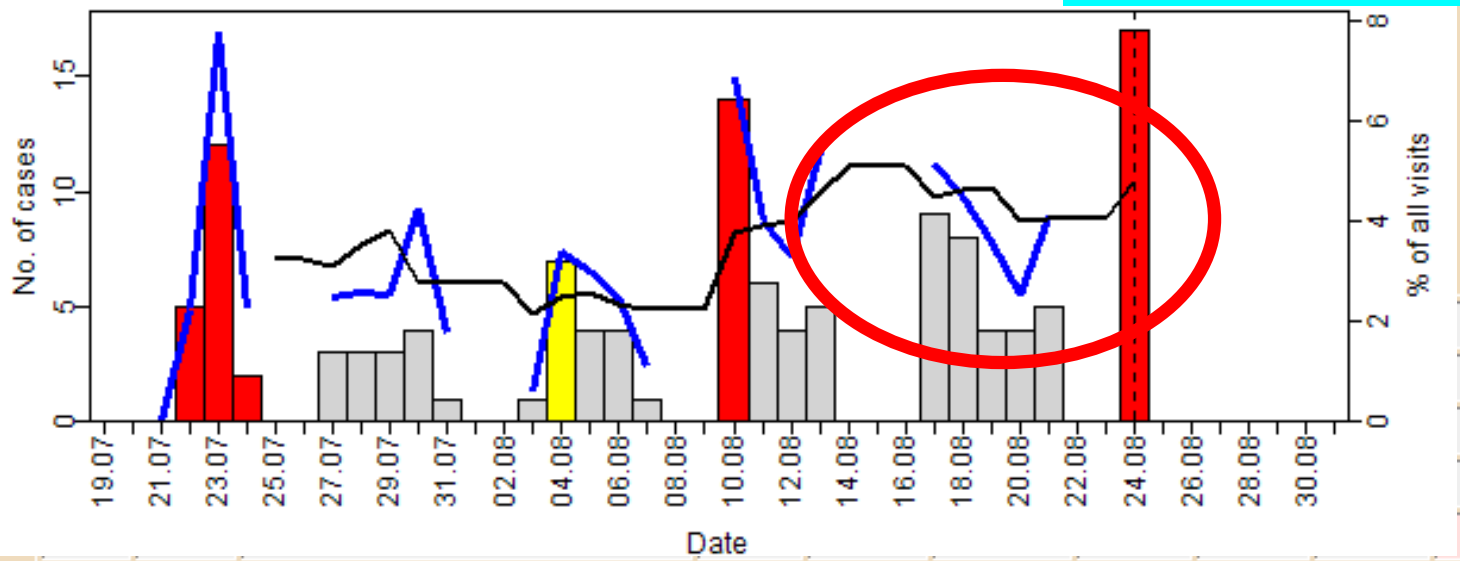
Note. %vis: percent of all visits (percent of all reports in mandatory notification system); pre7d: previous 7 days; cumul: cumulative since 2004-07-19

24 Aug

Attiki

Primary care sentinel system,

Gastroenteritis



Statistical Tests	
Poisson	**Binomial**
0.317974	0.794195
1.000000	1.000000
0.000175	**0.007590**

PIC	IMG	**Chickenpox**	0	0.0	0.2	0.1	19	0.2	1.000000	1.000000
PIC	IMG	**Pertussis**	0	0.0	0.0	0.0	0	0.0	1.000000	1.000000
PIC	IMG	**Measles**	0	0.0	0.0	0.0	0	0.0	1.000000	1.000000
PIC	IMG	**Rubella**	0	0.0	0.0	0.0	1	0.0	1.000000	1.000000
PIC	IMG	**Mumps**	0	0.0	0.0	0.0	0	0.0	1.000000	1.000000

Note. %vis: percent of all visits (percent of all reports in mandatory notification system); pre7d: previous 7 days; cumul: cumulative since 2004-07-19

25 Aug

Attiki

Hospital outpatient syndromic,

Gastroenteritis

APPENDIX F

Notifications in syndromic surveillance system- OG Hospitals by "Olympic" district

Attiki - 2004-08-25

Total visits reported :3771

			2004-08-25		pre7d		cumul		Statistical Tests	
			n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Respiratory infection	155	4.1	101.7	3.6	4681	4.3	**0.000001**	0.038558
PIC	IMG	Bloody diarrhoea	9	0.2	4.9	0.2	113	0.1	0.059166	0.196846
PIC	IMG	Gastroenteritis	133	3.5	105.0	3.7	3616	3.3	**0.004751**	0.692170
PIC	IMG	Fever with rash	20	0.5	10.3	0.4	661	0.6	**0.004667**	0.951537
PIC	IMG	Meningitis*	5	0.1	3.3	0.1	128	0.1	0.234810	0.435629
PIC	IMG	Hepatitis A	1	0.0	1.1	0.0	64	0.1	0.681093	0.778386
PIC	IMG	Botulism compatible syndrom	2	0.1	0.4	0.0	24	0.0	0.069373	0.110488
PIC	IMG	Lymphadenitis with fever	2	0.1	0.9	0.0	48	0.0	0.211879	0.311905
PIC	IMG	Septic/unexplained shock	0	0.0	0.7	0.0	29	0.0	1.000000	1.000000
PIC	IMG	Unexplained death - fever	5	0.1	3.6	0.1	124	0.1	0.288107	0.506926

Note. %vis: percent of all visits (percent of all reports in mandatory notification system); pre7d: previous 7 days; cumul: cumulative since 2004-07-19

* Syndrome compatible with meningitis, encephalitis or unexplained acute encephalopathy / Delirium

APPENDIX F - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

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25 Aug

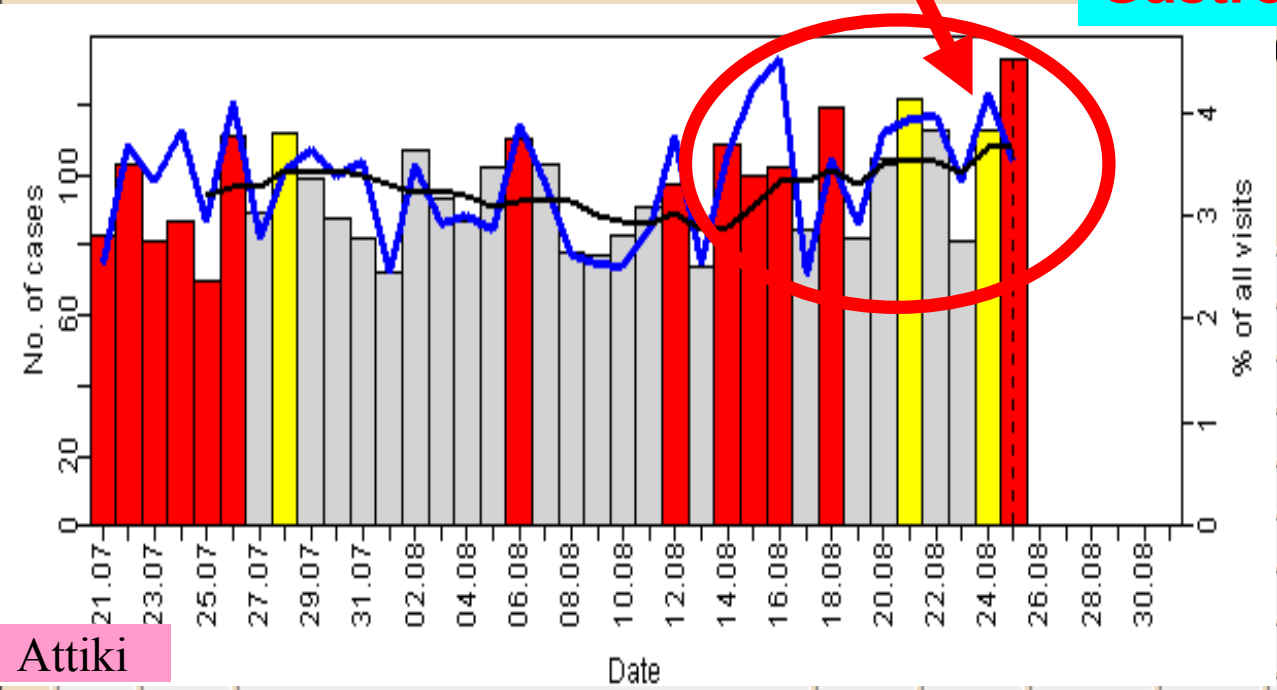
Attiki

Hospital outpatient syndromic,

Gastroenteritis

2

APPENDIX F



Attiki

ls by "Olympic" district

				cumul		Statistical Tests	
				n	%vis	Poisson	Binomial
PIC	IMG	Botulism compatible syndrom	2	0.1	0.4	0.0	24	0.0	0.069373	0.110488
PIC	IMG	Lymphadenitis with fever	2	0.1	0.9	0.0	48	0.0	0.211879	0.311905
PIC	IMG	Septic/unexplained shock	0	0.0	0.7	0.0	29	0.0	1.000000	1.000000
PIC	IMG	Unexplained death - fever	5	0.1	3.6	0.1	124	0.1	0.288107	0.506926

							4681	4.3	**0.000001**	0.038558
							113	0.1	0.059166	0.196840
							3616	3.3	**0.004751**	0.692170
							661	0.6	**0.004667**	0.059537
							128	0.1	0.234810	0.435629
							64	0.1	0.681093	0.778386

Note. %vis: percent of all visits (percent of all reports in mandatory notification system); pre7d: previous 7 days; cumul: cumulative since 2004-07-19

* Syndrome compatible with meningitis, encephalitis or unexplained acute encephalopathy / Delirium

Local intranet

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24 Aug 3
All OG districts
Mandatory notification
Salmonellosis

APPENDIX C

Notifications in Mandatory Notification System (diseases to be reported immediately or within 24hrs)

All "Olympic" districts - 2004-08-24

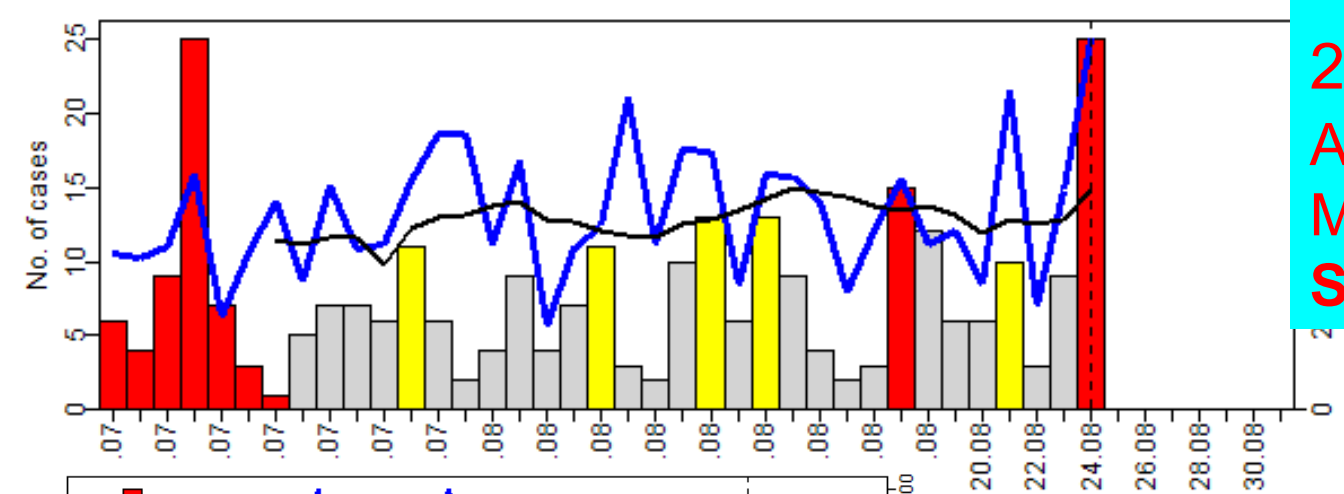
			2004-08-24	pre7d	cumul	Historical Data	Statistical Tests	
			n	mean	n	NN7d mean	Poisson	Binomial
Hepatitis								
PIC	IMG	Hepatitis A	0	0.1	7	3.41	1.000	1.000
Foodborne, waterborne diseases								
PIC	IMG	Foodborne outbreaks	0	0.9	29	NA	1.000	1.000
PIC	IMG	Typhoid / Paratyphoid fever	0	0.1	4	0.01	1.000	1.000
PIC	IMG	Salmonellosis	25	8.7	495	11.9	**0.000**	**0.000**
PIC	IMG	Shigellosis	0	0.9	25	0.08	1.000	1.000
PIC	IMG	Infection with EHEC	0	0.0	0	NA	1.000	1.000
PIC	IMG	Trichinosis	0	0.0	0	NA	1.000	1.000

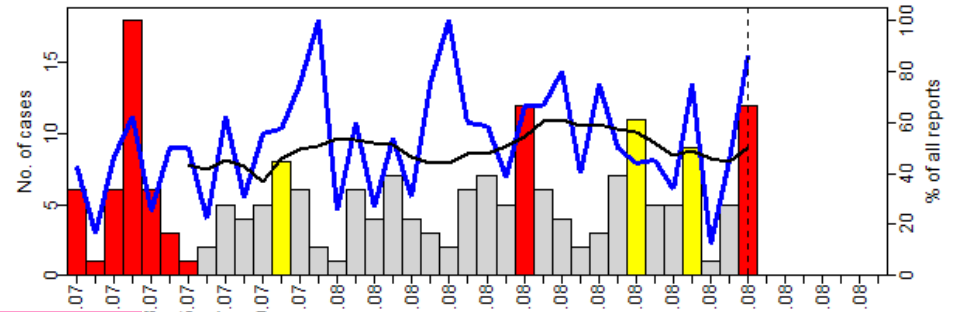
24 Aug 3

All OG districts

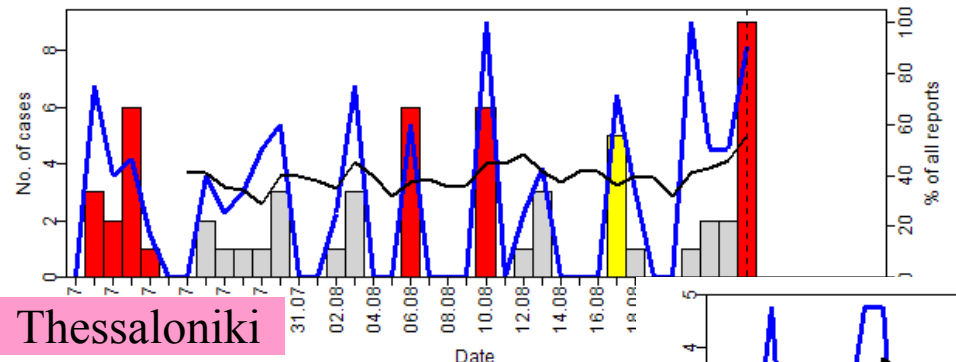
Mandatory notification

Salmonellosis

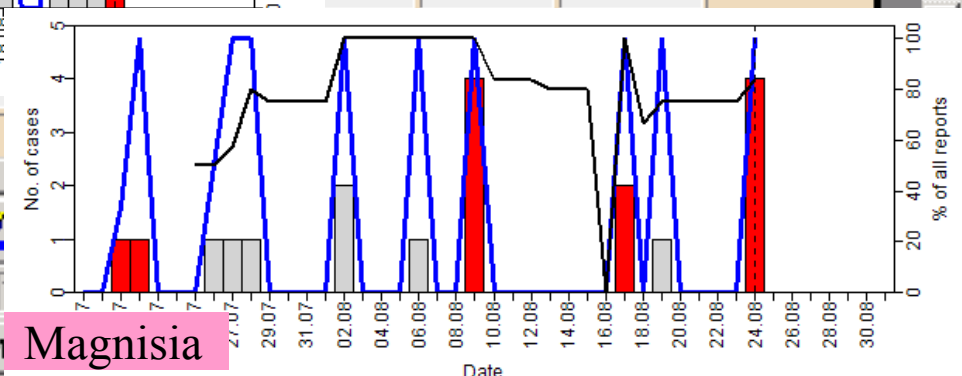




Attiki



Thessaloniki



Magnisia

s - 2004-08-24

re7d	cumul	Historical Data	Statistical Tests	
ean	n	NN7d mean	Poisson	Binomial
			1.000	1.000
			1.000	1.000
			1.000	1.000
			0.000	**0.000**
			1.000	1.000

Foodborn

PIC	IMG
PIC	IMG
PIC	IMG
PIC	IMG
PIC	IMG
PIC	IMG

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25 Aug

4

Attiki

Hospital outpatient syndromic,

Bloody diarrhoea

APPENDIX F

Notifications in syndromic surveillance system- OG Hospitals by "Olympic" district

Attiki - 2004-08-25

Total visits reported :3771

			2004-08-25		pre7d		cumul		Statistical Tests	
			n	%vis	mean	%vis	n	%vis	Poisson	Binomial
PIC	IMG	Respiratory infection	[illegible]	4.1	101.7	3.6	4681	4.3	[illegible]	[illegible]
PIC	IMG	Bloody diarrhoea	9	0.2	4.9	0.2	113	0.1	0.059166	0.196840
PIC	IMG	Gastroenteritis	[illegible]	3.5	105.0	3.7	3616	3.3	[illegible]	[illegible]
PIC	IMG	Fever with rash	20	0.5	10.3	0.4	661	0.6	**0.004667**	0.059537
PIC	IMG	Meningitis*	5	0.1	3.3	0.1	128	0.1	0.234810	0.435629
PIC	IMG	Hepatitis A	1	0.0	1.1	0.0	64	0.1	0.681093	0.778386
PIC	IMG	Botulism compatible syndrom	2	0.1	0.4	0.0	24	0.0	0.069373	0.110488
PIC	IMG	Lymphadenitis with fever	2	0.1	0.9	0.0	48	0.0	0.211879	0.311905
PIC	IMG	Septic/unexplained shock	0	0.0	0.7	0.0	29	0.0	1.000000	1.000000
PIC	IMG	Unexplained death - fever	5	0.1	3.6	0.1	124	0.1	0.288107	0.506926

Note. %vis: percent of all visits (percent of all reports in mandatory notification system); pre7d: previous 7 days; cumul: cumulative since 2004-07-19

* Syndrome compatible with meningitis, encephalitis or unexplained acute encephalopathy / Delirium

APPENDIX F - Microsoft Internet Explorer

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25 Aug

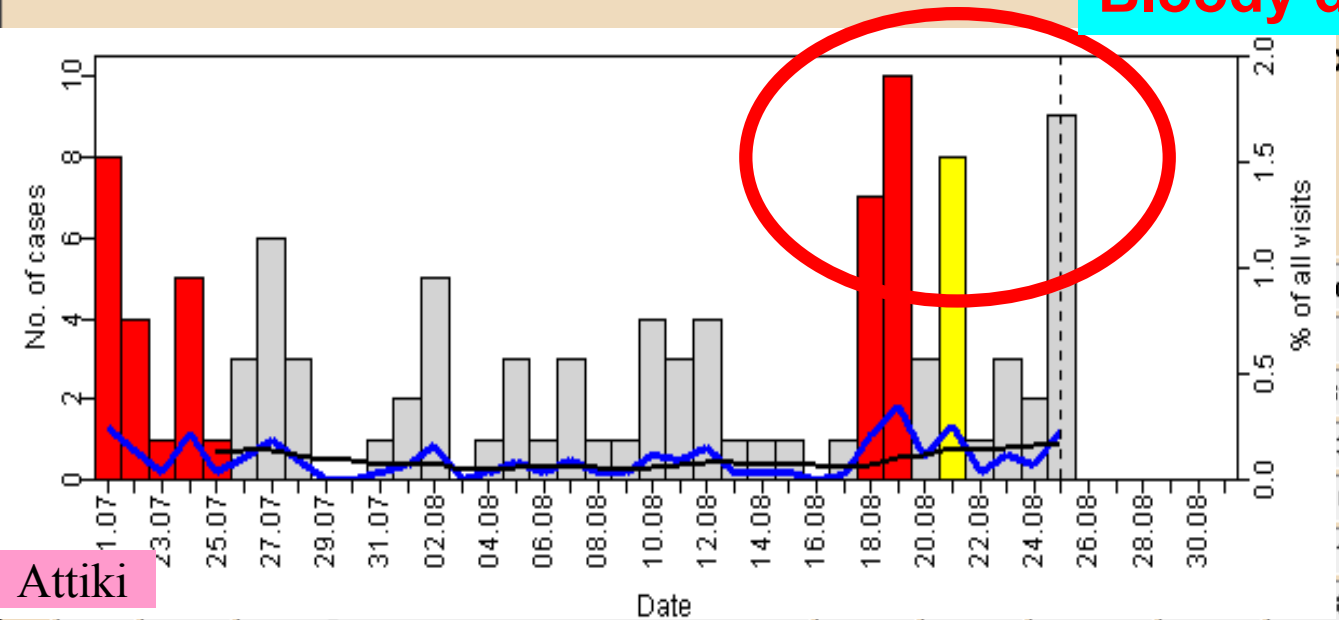
Attiki

Hospital outpatient syndromic,

Bloody diarrhoea

4

APPENDIX F



Attiki

by "Olympic" district

							cumul		Statistical Tests	
								%vis	Poisson	Binomial
PIC	IMG	Hepatitis A	1	0.0	1.1	0.0	64	0.1	0.681093	0.778386
PIC	IMG	Botulism compatible syndrom	2	0.1	0.4	0.0	24	0.0	0.069373	0.110488
PIC	IMG	Lymphadenitis with fever	2	0.1	0.9	0.0	48	0.0	0.211879	0.311905
PIC	IMG	Septic/unexplained shock	0	0.0	0.7	0.0	29	0.0	1.000000	1.000000
PIC	IMG	Unexplained death - fever	5	0.1	3.6	0.1	124	0.1	0.288107	0.506926

							1	4.3	**0.000001**	0.038558
							3	0.1	0.059166	0.196840
							6	3.3	**0.004751**	0.692170
							1	0.6	**0.004667**	0.059537
							8	0.1	0.234810	0.435629

Note. %vis: percent of all visits (percent of all reports in mandatory notification system); pre7d: previous 7 days; cumul: cumulative since 2004-07-19

* Syndrome compatible with meningitis, encephalitis or unexplained acute encephalopathy / Delirium

Local intranet

Start Sen... \\Ka... C:\b... APP... F:\D... Micr... Doc... APP... EN 8:55 μμ

Is it an outbreak ?

How should we respond ?

Active verification

Communication with hospitals/physicians accounting for reports that gave rise to signals

- Clusters ?
- Relation to Olympic Games ?
- Geographical pattern ?
- Pattern of age distribution ?
- Stool culture results in cases of bloody diarrhoea ?

No cluster or pattern

Different pathogens

Review of available data from Olympic Game enhanced surveillance

- Total number of visits
  - To physicians – primary care sentinel
  - To hospital outpatients - syndromic

  } No increase or pattern

- Laboratory reporting:
  - *Salmonella* → Increase similar to mandatory notification
  - *Shigella*
  - *Campylobacter*
  - EHEC
  - *Giardia lamblia*
  - *Cryptosporidium*
  - *Entamoeba histolytica*
  - *Yersinia enterocolytica*

  } No increase or pattern

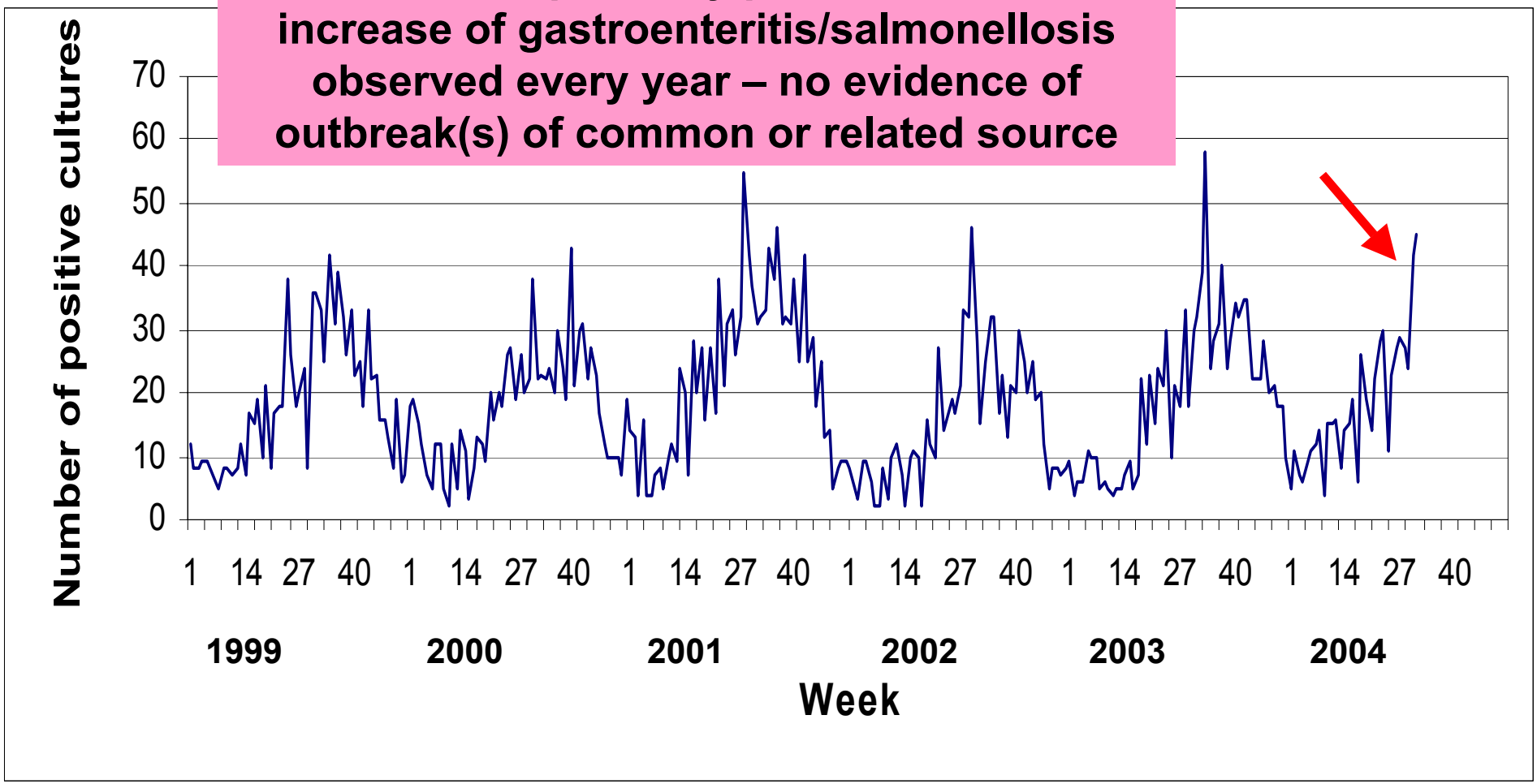
Review of available data from routine surveillance (incl. data from pevious years)

- Primary care sentinel physicians
  - Gastroenteritis
- Mandatory notification
  - *Salmonella*
- Laboratory system
  - *Salmonella*

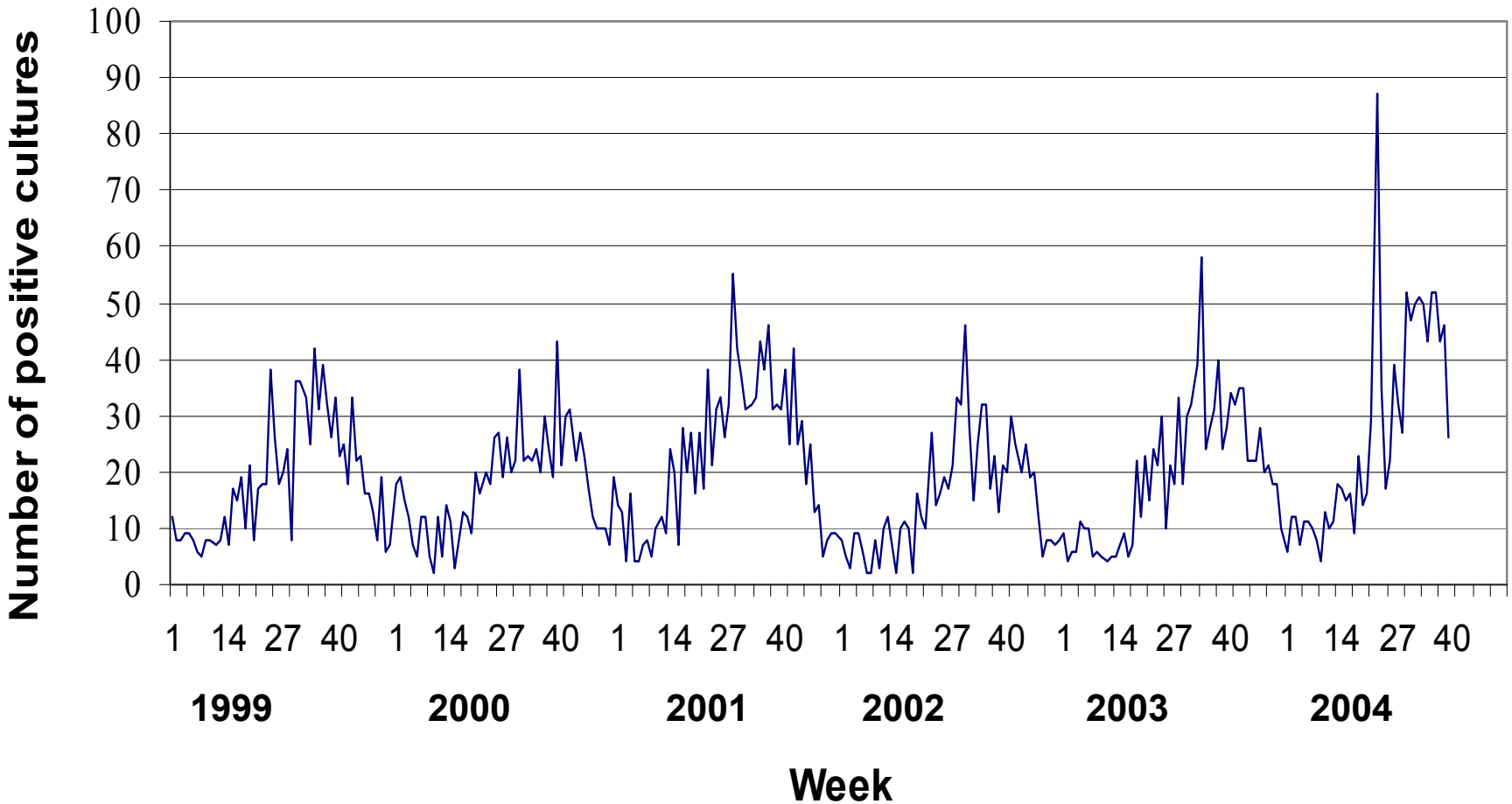
Pattern of seasonal trend in summer

Reported cases of salmonellosis, laboratory reporting, Greece, 1999 to 2004 (week 34)

The event was probably part of the seasonal increase of gastroenteritis/salmonellosis observed every year – no evidence of outbreak(s) of common or related source



Reported cases of salmonellosis, laboratory reporting, Greece, 1999 to 2004 (week 40)



Main results of OG surveillance, 1-31 August 2004 (1)

• Mandatory notification	**443**
– Salmonellosis	237 (54%)
– Tuberculosis	77 (17%)
– Hepatitis B	20 (5%)
– Meningitis aseptic	19 (4%)
– Meningitis bacterial	17 (4%)
– Small clusters of foodborne disease (2-5 cases)*	14
– Larger outbreaks of foodborne dis. (6-38 cases)*	8
• Laboratory notification	**406**
– Salmonella	270 (67%)
– Campylobacter	78 (19%)

* none related to OGs

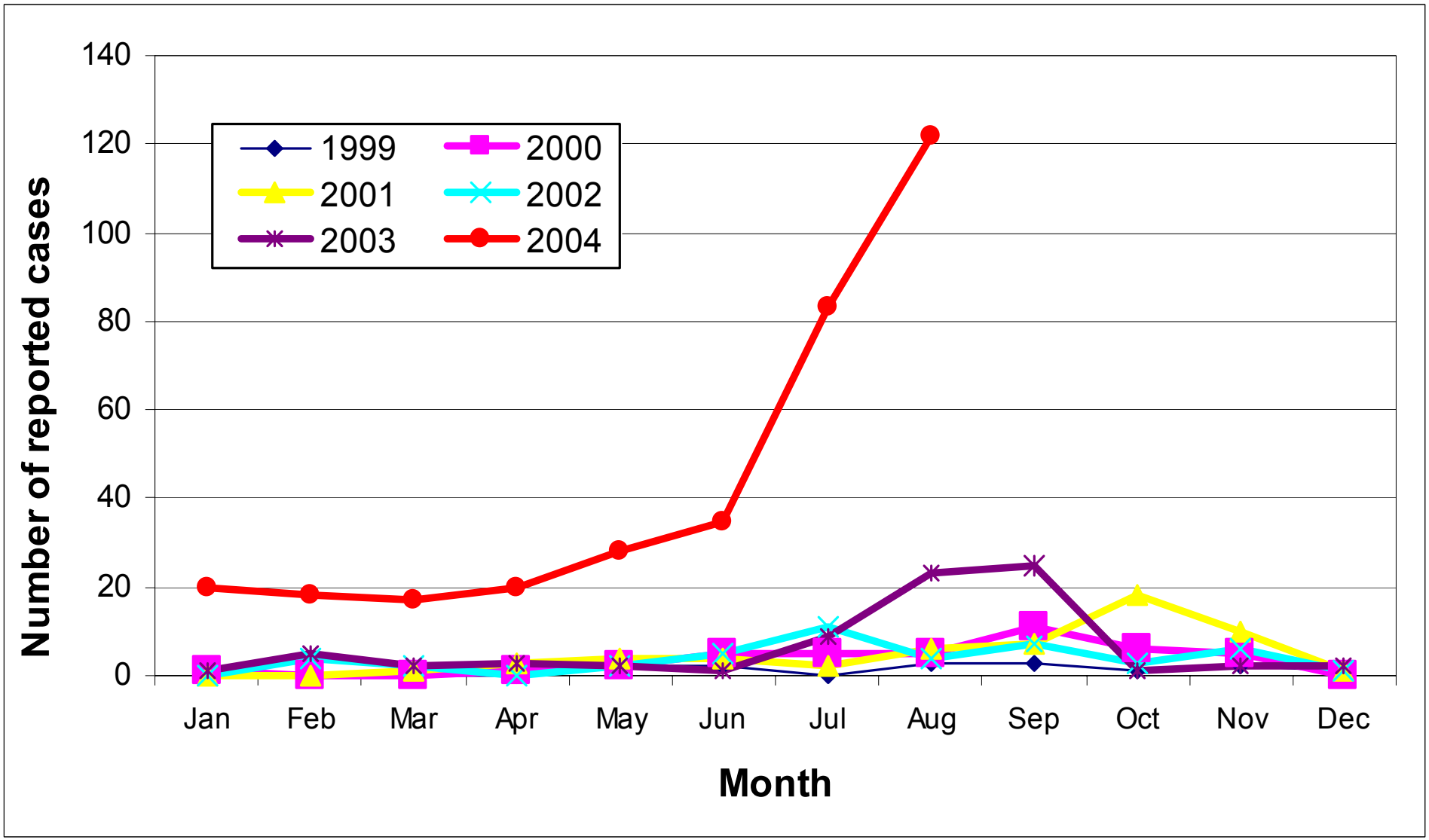
Main results of OG surveillance, 1-31 August 2004 (2)

- Dis. of respiratory system (mandatory notif.)
  - Legionellosis 7 (1,6%)
  - Pertussis 6 (1,3%)
- Zoonoses (mandatory notif.)
  - Brucellosis 4 (0,9%)
  - Echinococcosis 5 (1,1%)
  - Leismaniasis 5 (1,1%)
  - Leptospirosis 4 (0,9%)
- Other foodborne diseases (mandatory notif.)
  - Shigellosis 13 (2,9%)
  - Typhoid / paratyphoid fever 3 (0,7%)
- Imported diseases (mandatory notif.)
  - Malaria 4 (0,9%)

Main results of OG surveillance, 1-31 August 2004 (3)

• Primary care sentinel physicians	**356**
– Respiratory infection	215 (6,7%)
– Gastroenteritis	120 (3,4%)
• "Syndromic surveillance" - hosp. outpatient	**11.226**
– Respiratory infection	5551 (4,2%)
– Gastroenteritis	4498 (3,4%)
• "Syndromic surveillance" – athletic venues	**187**
– Respiratory infection	56 (0,4%)
– Gastroenteritis	118 (1,4%)
• "Syndromic surveillance" – cruise ships	**36**
– Influenza-ike illness	1 (0,0%)
– Gastroenteritis	35 (2,5%)

Reported cases of salmonellosis (mandatory notification system), Greece, Jan 1999 – Aug 2004

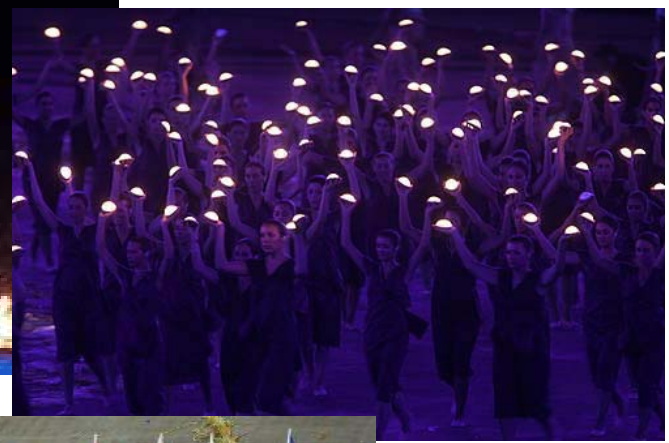


Lessons learnt (1)

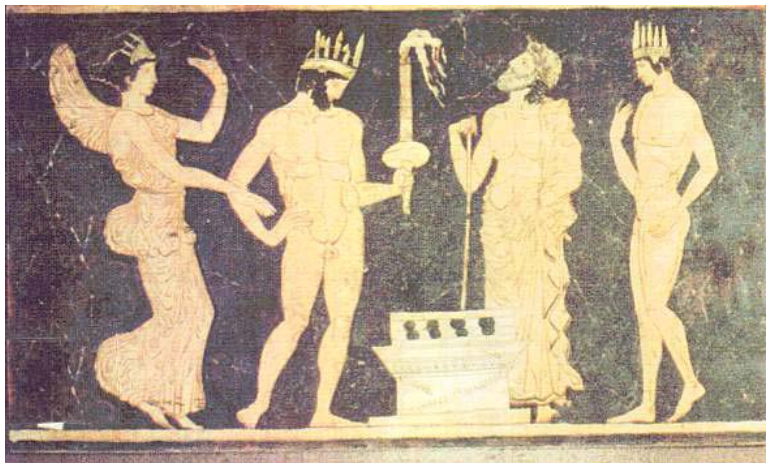
1. Daily reporting during mass gathering of high visibility can be well accepted by health personnel
2. Increased sensitivity of enhanced surveillance requires increased specialist capacity for verification and minor interventions
3. Importance of clear standard operational procedures to review day's picture of morbidity, critically appraise public health significance of statistical signals, decide on necessary action, and respond appropriately (verification, investigation, control measures)
4. Importance of personal relations with hospital and other health unit staff (e.g. person responsible for surveillance in hospitals)
5. Importance of international cooperation for interpreting international situation and ensuring coordination

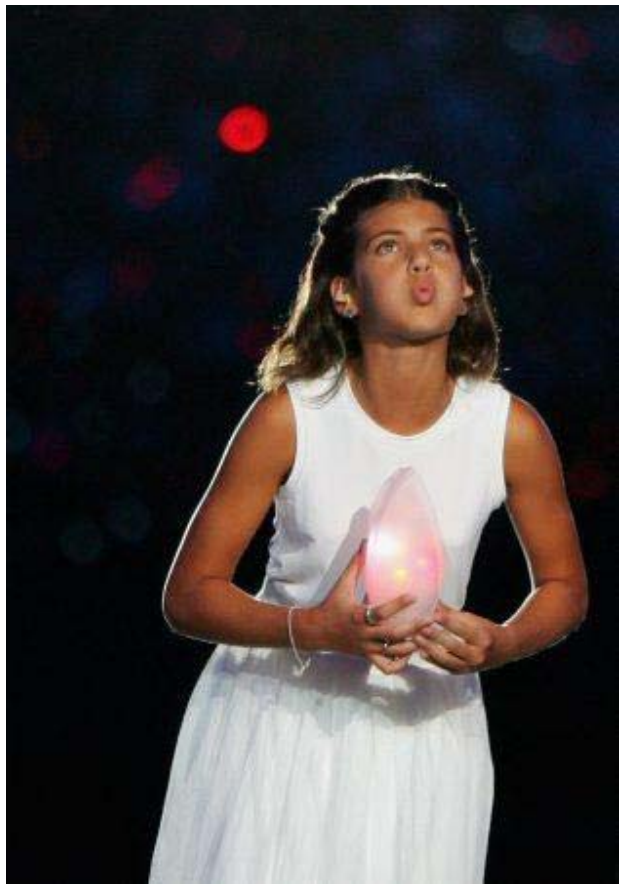
Lessons learnt (2)

6. Importance of appropriate software to assimilate large amount of information
7. Statistical signals based on short-term comparisons can assist review of large amount of data, but limitations must be borne in mind (large number of comparisons, often small number of cases, changes in population, changes in health care system etc.)
8. Daily surveillance report not made public: no feedback to health professional providing information, could have been major problem in crisis situation
9. Mass event of national focus (or other extra-ordinary event): opportunity for reorganisation of surveillance system
10. Challenge: keep momentum – plan in advance for needs of "day after", major organisational issues settled



… and don't forget to enjoy the event





Thank you