VIRAL HEPATITIS PREVENTION BOARD MEETING

ATHENS, GREECE, NOVEMBER 15-16, 2007

Experience gained from Surveillance of Infectious Diseases during the Olympics. How can we extend it to real life?

Sotirios Tsiodras, MD, MSc, PhD

Hellenic Ctr for Disease Control and Prevention

University of Athens Medical School

ATHENS 2004 OLYMPICS!!!

Athens 2004

- 2 events
  - Main event
    - Olympic Games: 13-29 August
  - Second event
    - Paralympic Games: 15-29 September


Geographical Regions
Makedonia
Thessaloniki
Kavala
Thraki
Alexandroupolis
Thassos
Samothraki
Katerini
Limnos
Ipiros
Ioannina
Thessalia
Larisa
Kerkira
Volos
Sporades
Lesvos
Preveza
Skiros
North Aegean Islands
Lefkada
Sterea Ellada
Egeo Pelagos
(Aegean Sea)
Hios
Keffalonia
Patra
Athina
Ionian Islands
Peloponissos
Samos
Ikaria
Zakinthos
Mikonos
Siros
Kiklades
Paros
Naxos
Ionio Pelagos
Kalamata
Kos
Astypalaia
Milos
Dodekanissa
Rodos
Thira (Santorini)
Kithira
N
W
E
S
Hania
Karpathos
Heraklion
Rethimno
Kasos
Kriti
Aglos Nikolaos
Kastelorizo

Public Health Issues

- Largest mass gatherings in the world
  - A lot of people in same place temporally
    - 202 Countries, 520,000 visitors
  - Huge media attention
    - 5,500 media representatives
- Early detection and response to
  - a deliberate release of BCRN agent
    - First summer Olympics after 09/11/2001

Previous experience

- 1996 OGs, Atlanta, USA
  - Meehan P et al, JAMA 1998
- 2000 OGs, Sydney, Australia
  - Thackway SV, Med J Aust 2000
- 2002 Winter Olympic Games, Utah, USA
  - Gesteland PH et al. JAMIA 2003

GOALS OF SURVEILLANCE

- Recognition & response
  - outbreaks
  - BCRN events
  - single cases of infectious diseases that require measures to prevent further spread
- Evaluation of primary prevention measures

ENHANCING SURVEILLANCE

- Multiple surveillance systems in operation
- Daily reporting from health units
  - Dedicated surveillance staff
  - Zero reporting
- Daily analysis and review of data
  - Daily report

ENHANCING SURVEILLANCE

- Mandatory notification
- Laboratory reporting
- Primary care sentinel physician

routine

- New surveillance systems
  - Syndromic surveillance in
    - Hospital EDs
    - Olympic clinics
    - Cruise ships

ad hoc

ROUTINE SURVEILLANCE

- Major reorganization
- Reporting
  - Monthly $\Rightarrow$ weekly $\Rightarrow$ daily (OG)

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**	

ROUTINE SURVEILLANCE

- 69 health units participated
  - 51 in Attica
  - 16 in the other Olympic prefectures

ROUTINE SURVEILLANCE

- **Mandatory notification**
  - EU case definitions used
  - Revised forms
  - Protocols of public health action
  - Training of healthcare staff
    - 30 courses
      - Emphasis on Olympic hospitals and district Public Health staff

Mandatory notification

Diseases to be immediately reported

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

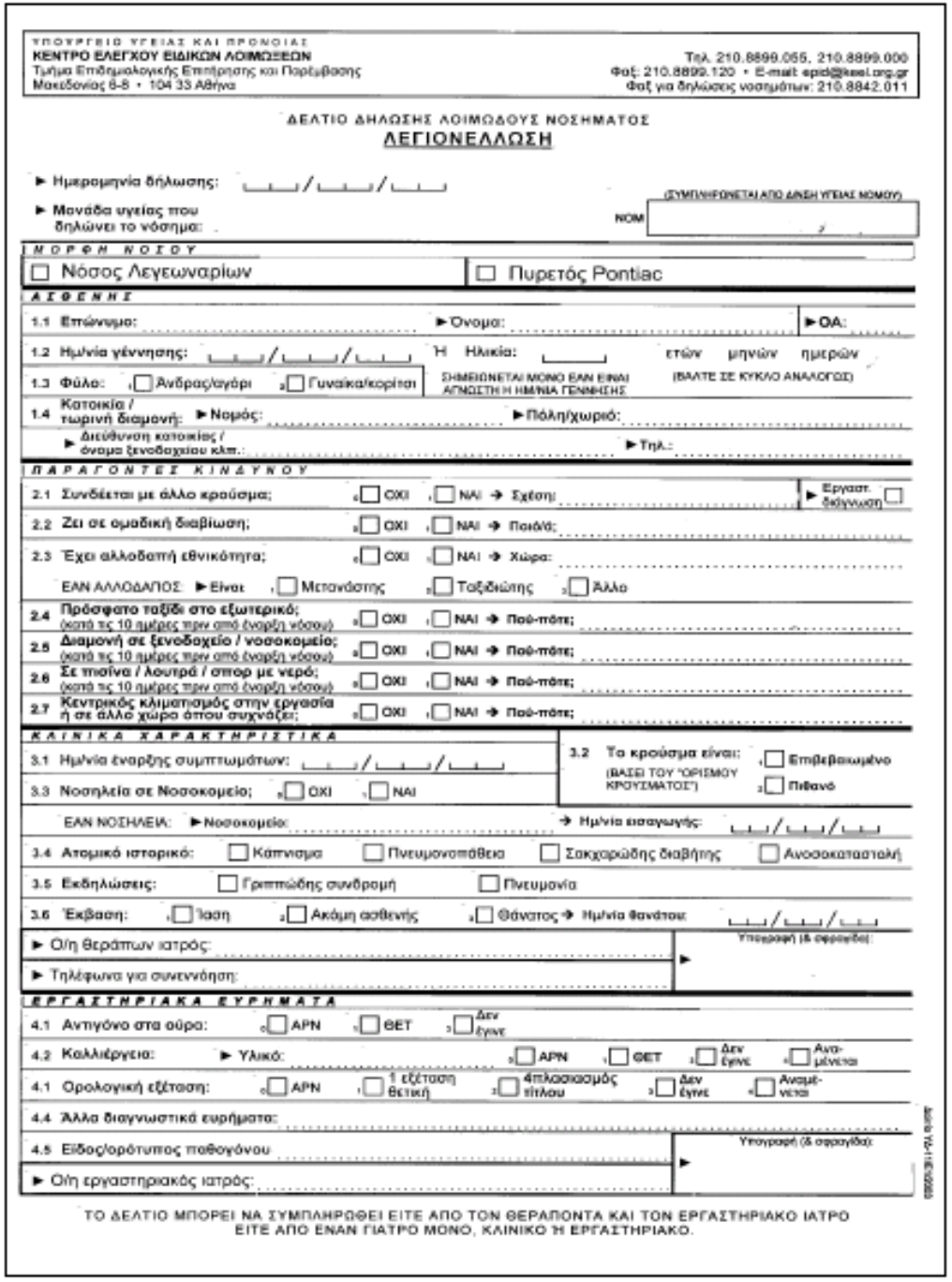
Diseases to be reported within 24 hours

- 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

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)



ΥΠΟΥΡΓΕΙΟ ΥΓΕΙΑΣ ΚΑΙ ΠΡΟΝΟΙΑΣ
ΚΕΝΤΡΟ ΕΛΕΓΧΟΥ ΕΙΔΙΚΩΝ ΛΟΙΜΩΞΕΩΝ
Τμήμα Επιδημιολογικής Επιτήρησης και Παρέμβασης
Μακεδονίας 6-8 • 104 33 Αθήνα

Τηλ. 210.8899.055, 210.8899.000
Φαξ: 210.8899.120 • E-mail: epid@keel.org.gr
Φαξ για δηλώσεις νοσημάτων: 210.8842.011

ΔΕΛΤΙΟ ΔΗΛΩΣΗΣ ΛΟΙΜΩΔΟΥΣ ΝΟΣΗΜΑΤΟΣ

ΛΕΓΙΟΝΕΛΛΩΣΗ

► Ημερομηνία δήλωσης: __/__/__

► Μονάδα υγείας που δηλώνει το νόσημα:

(ΣΥΜΠΛΗΡΩΝΕΤΑΙ ΑΠΟ ΔΗΜΗ 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; 1 ☐ ΟΧΙ 1 ☐ ΝΑΙ → Σχέση: ► Εργαστ. διάγνωση ☐

2.2 Ζει σε ομαδική διαβίωση; 1 ☐ ΟΧΙ 1 ☐ ΝΑΙ → Ποιά/ό:

2.3 Έχει αλλοδαπή εθνικότητα; 1 ☐ 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) 1 ☐ ΟΧΙ 1 ☐ ΝΑΙ → **Πού-πότε;**

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

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

2.7 **Κεντρικός κλιματισμός στην εργασία ή σε άλλο χώρο όπου συχνάζει;** 1 ☐ 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; 1 ☐ ΟΧΙ 1 ☐ ΝΑΙ

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

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

3.5 Εκδηλώσεις: ☐ Γριπποειδής 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 ☐ APN 1 ☐ ΘΕΤ 2 ☐ Δεν έγινε

4.2 Καλλιέργεια: ► Υλικό: 0 ☐ APN 1 ☐ ΘΕΤ 2 ☐ Δεν έγινε 3 ☐ Αναμένεται

4.1 Ορολογική εξέταση: 0 ☐ APN 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.

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

ROUTINE SURVEILLANCE

- **Mandatory notification**
  - Mobile health units
    - Mobile populations, immigrants and other refugees.
  - Response / outbreak investigation capacity
    - 4 teams during OGs

ROUTINE SURVEILLANCE

- **Laboratory reporting**
  - 16 Reference & satellite labs
    - Protocols for select pathogens (n=25)
      - Collection, transportation, lab processing
    - Link with ref labs abroad

- **Primary care sentinel physician**
  - **Primary care physicians**
  - **3 syndromes / 5 IDs**

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)

SYNDROMIC SURVEILLANCE UTAH 2002

- Over 114,000 acute care encounters
  - 2/8/2002 to 3/31/2002.
- Successfully implemented & operational during Winter 2002 OGs
- No outbreaks of public health significance
- Remains operational today

SYNDROMIC SURVEILLANCE GREECE 2002-2004

- Major objective
  - early detection of BT event
  - detect potential disease outbreaks quickly
- 10 + 1 syndromes

SYNDROMES - HIERARCHY

1. Unexplained death with history of fever
2. Meningitis, encephalitis or unexplained acute encephalopathy or delirium
3. Sepsis or unexplained shock
4. Botulism-like syndrome
5. Febrile illness with rash
6. Bloody diarrhoea
7. Respiratory infection with fever
8. Suspected viral hepatitis (acute)
9. Lymphadenitis with fever
10. Gastroenteritis (diarrhoea and vomiting) without blood
11. Other syndrome of possible interest to public health

SYNDROMIC SURVEILLANCE ATHENS 2002-2004

- Piloted 2002 and 2003
  - Weekly data collection retrosp analysis
    - Based upon chief complaint ED logs
  - Alert levels with specialized algorithms
- Intensification during the OG
  - Daily data collection from 31 points
  - Daily analysis & reports
    - Customized data forms

Pulsar Analysis Approach

Respiratory Infection with Fever

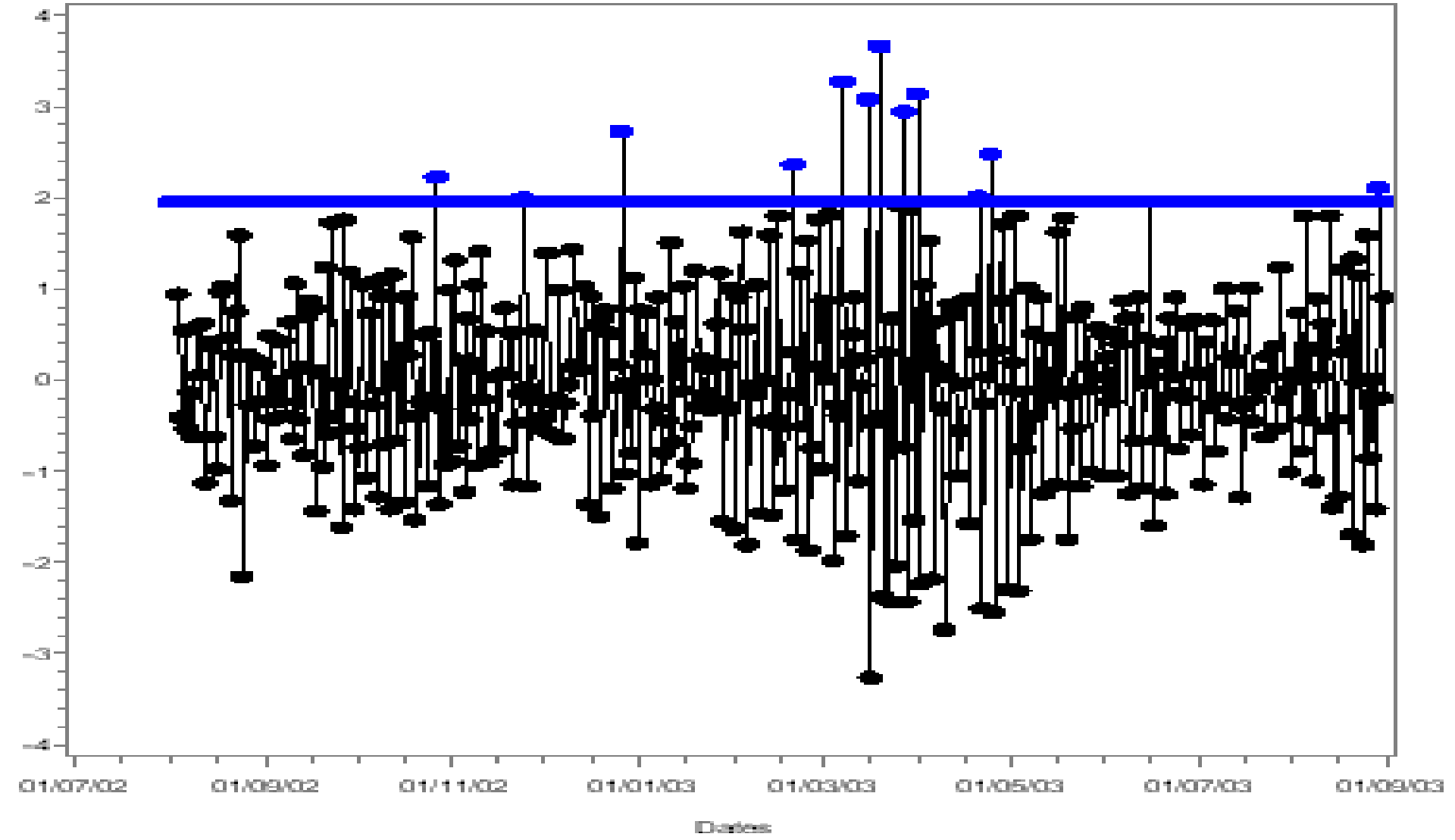
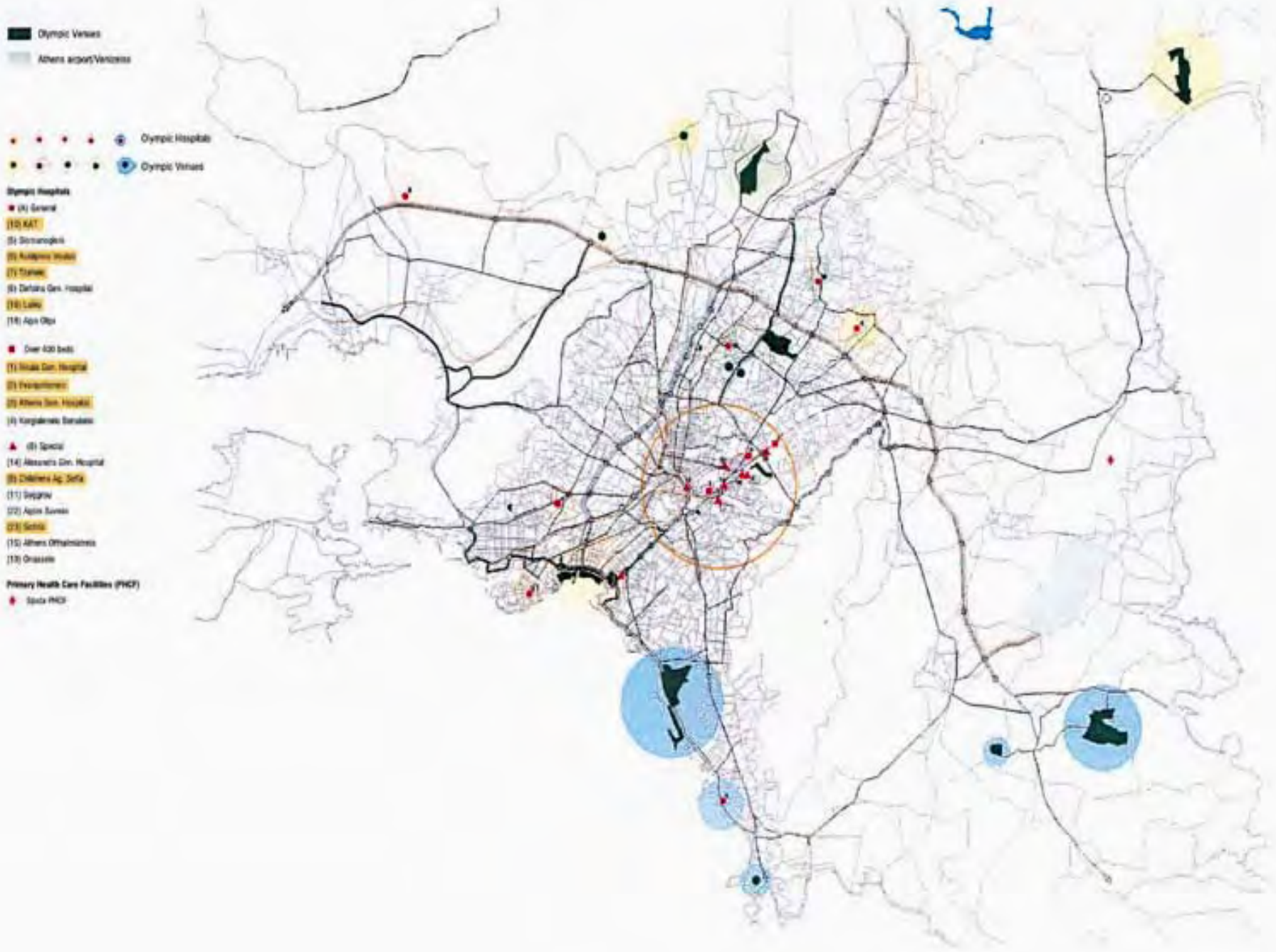


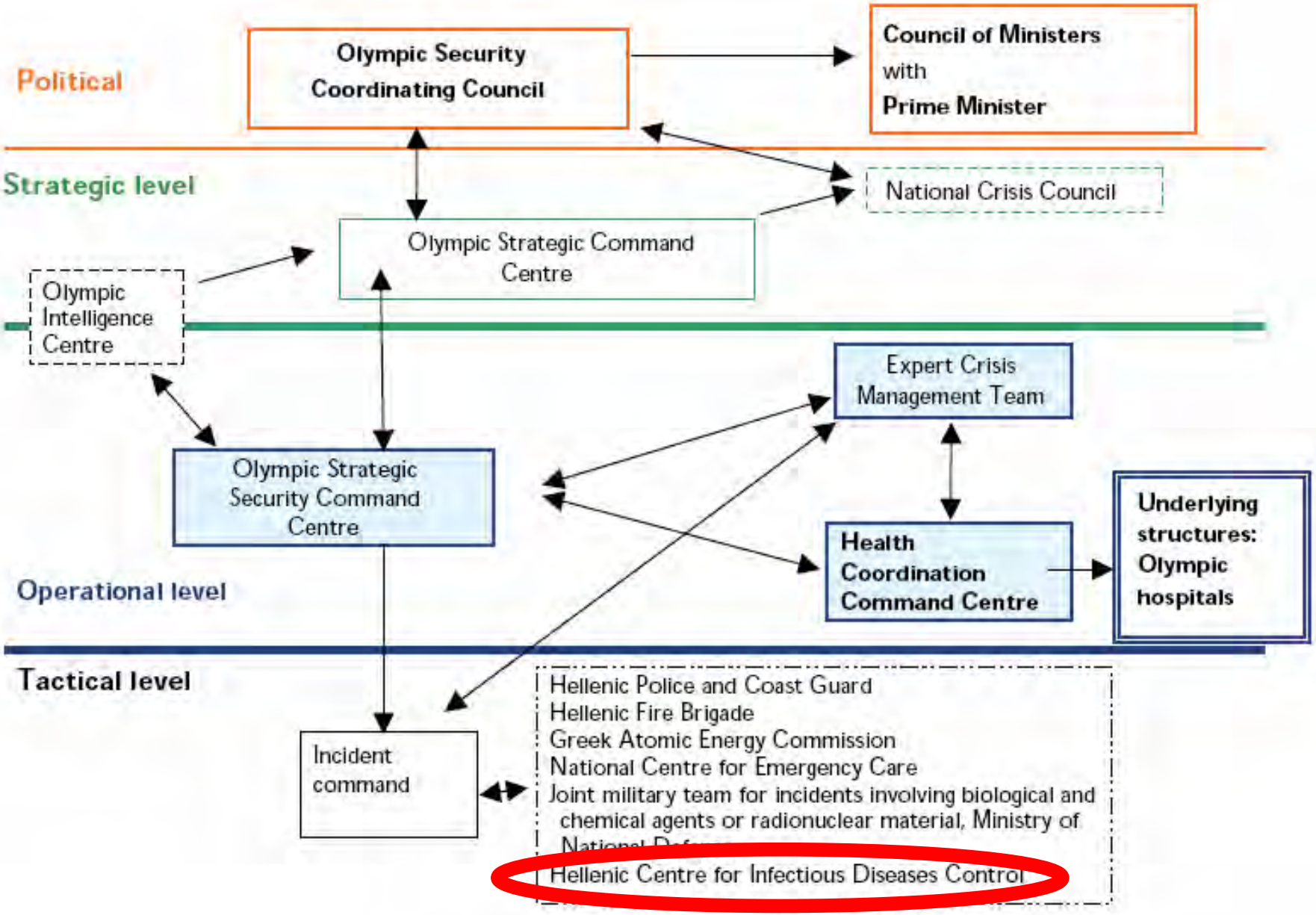
Illustration of original series


Olympic Venues
Athens airport/Venizelos
Olympic Hospitals
Olympic Venues
Olympic Hospitals
(A) General
(10) KAT
(5) Sismanoglio
(6) Asklipieio Voulas
(7) Tzaneio
(9) Dafnaia Gen. Hospital
(16) Laiko
(18) Agia Olga
Over 400 beds
(1) Hrisa Gen. Hospital
(2) Evangelismos
(3) Athens Gen. Hospital
(4) Korgialeneio Benakeio
(8) Special
(14) Alexandra Gen. Hospital
(8) Children's Ag. Sofia
(11) Syggrou
(12) Agios Savvas
(17) Sotiria
(15) Athens Ophalmiatreio
(19) Onassio
Primary Health Care Facilities (PHCF)
Sports PHCF

IN THE VENUES

- Health clinics in residence areas, stadiums and event sites
  - 220 venue clinics were in operation,
  - 30–120 of them were functioning every day
- Syndromic surveillance
  - Health clinics
  - 10 cruise ships in Piraeus
    - floating hotels for Olympic guests

CBRN

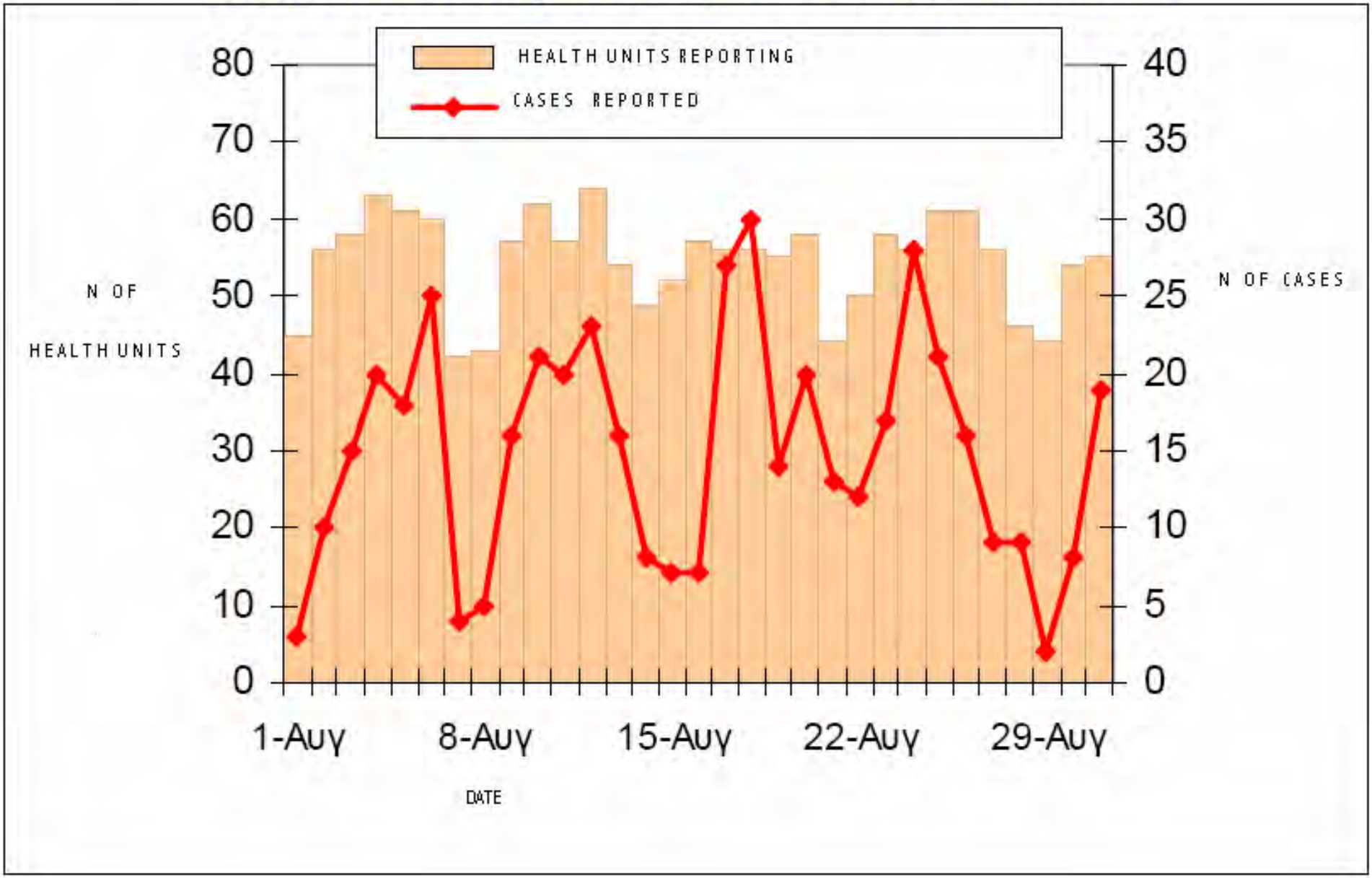

Political
Olympic Security Coordinating Council
Council of Ministers with Prime Minister
Strategic level
National Crisis Council
Olympic Strategic Command Centre
Olympic Intelligence Centre
Expert Crisis Management Team
Olympic Strategic Security Command Centre
Health Coordination Command Centre
Underlying structures: Olympic hospitals
Operational level
Tactical level
Incident command
Hellenic Police and Coast Guard
Hellenic Fire Brigade
Greek Atomic Energy Commission
National Centre for Emergency Care
Joint military team for incidents involving biological and chemical agents or radionuclear material, Ministry of
Hellenic Centre for Infectious Diseases Control

SURVEILLANCE RESULTS

HEALTH UNIT/PHYSICIAN PARTICIPATION

Surveillance system	Mean number of units reporting daily	Total number of units in enhanced surveillance	%[a]
Mandatory notification	54.5	69	79.0%[b]
Laboratory notification: stool cultures	29.5	69	NA[c]
Laboratory notification: serology	8.1	15	NA[c]
Primary care sentinel physicians	36.5	49	74.5%
Syndromic surveillance: hospital emergency departments	10–17[d]	31	100%
Syndromic surveillance: Olympic venues	30–120[d]	220	100%
Syndromic surveillance: cruise ships	8–10[e]	10	100%

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



Surveillance results

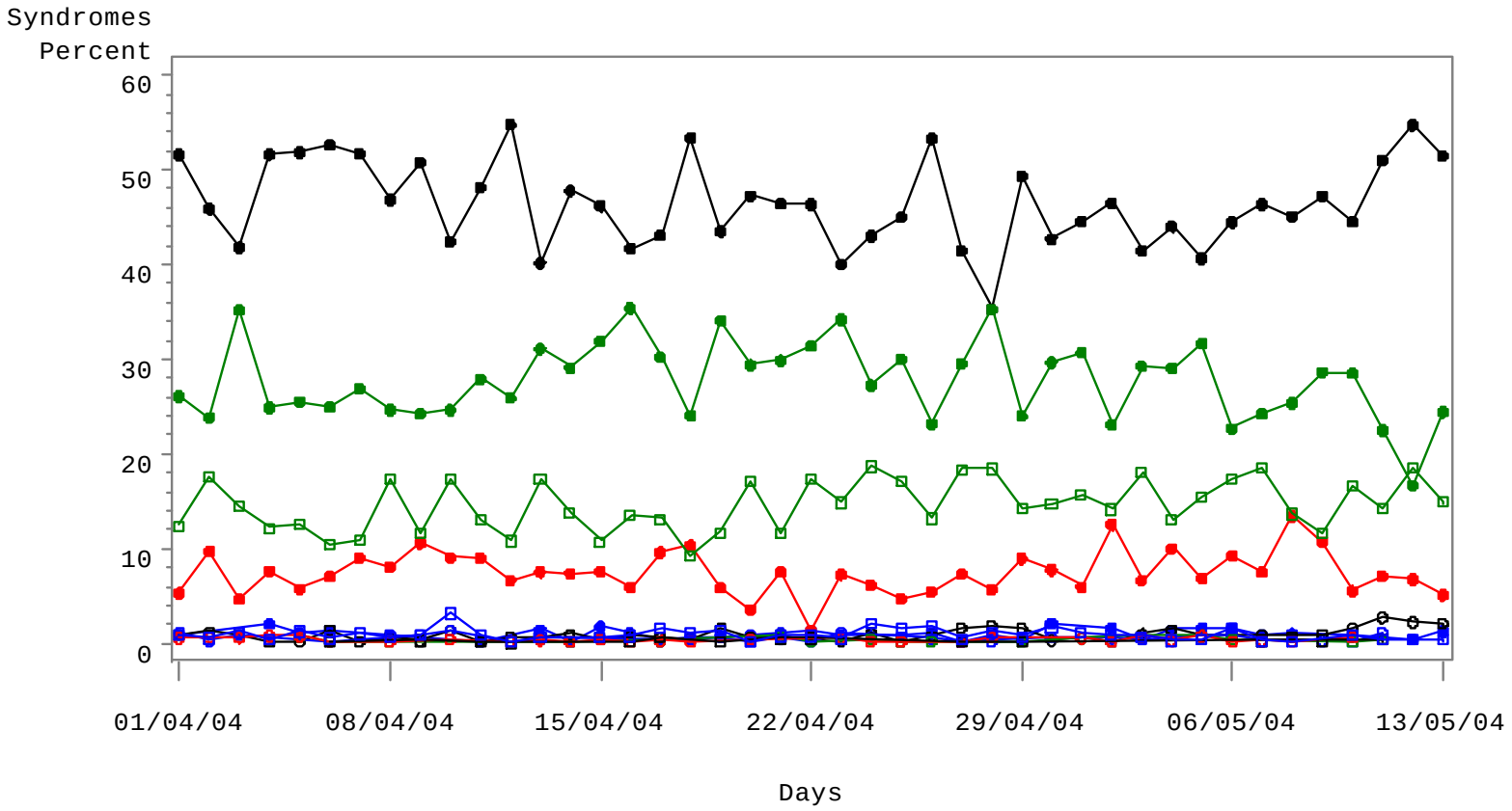
- **Mandatory notification**
  - Salmonellosis 54 %
  - Tuberculosis 17 %
- **Laboratory notification**
  - Salmonella spp 67 %
  - Campylobacter spp 19%

HEPATITIS !!!

• Hepatitis A	4/443	0.9 %
• Hepatitis B	20/443	4.5 %
• Hepatitis C	11/443	2.4 %

Syndrome	Attica	Thessaloniki	Achaia	Heraklio	Magnesia	Total[a]	%
Respiratory infection	3 663	883	231	387	387	5 551	4.2
Diarrhoea with blood	86	18	22	5	8	139	0.1
Gastroenteritis	3 077	612	248	303	258	4 498	3.4
Fever with rash	461	59	45	35	32	632	0.5
Meningitis[b]	91	12	5	6	10	124	0.1
Hepatitis A[c]	44	22	0	2	0	68	0.1
Syndrome compatible with botulism	17	6	0	0	4	27	0
Lymphadenitis and fever	35	10	3	4	4	56	0
Septic or unexplained shock	24	0	0	1	1	26	0
Unexplained death	96	7	0	0	2	105	0.1
Total cases of syndromes reported	**7 594**	**1 629**	**554**	**743**	**706**	**11 226**	**8.6**
Total visits (all causes)	91 765	19 552	4 512	8 892	6 333	131 054	100

Relative frequency of syndromes per day



Syndrome

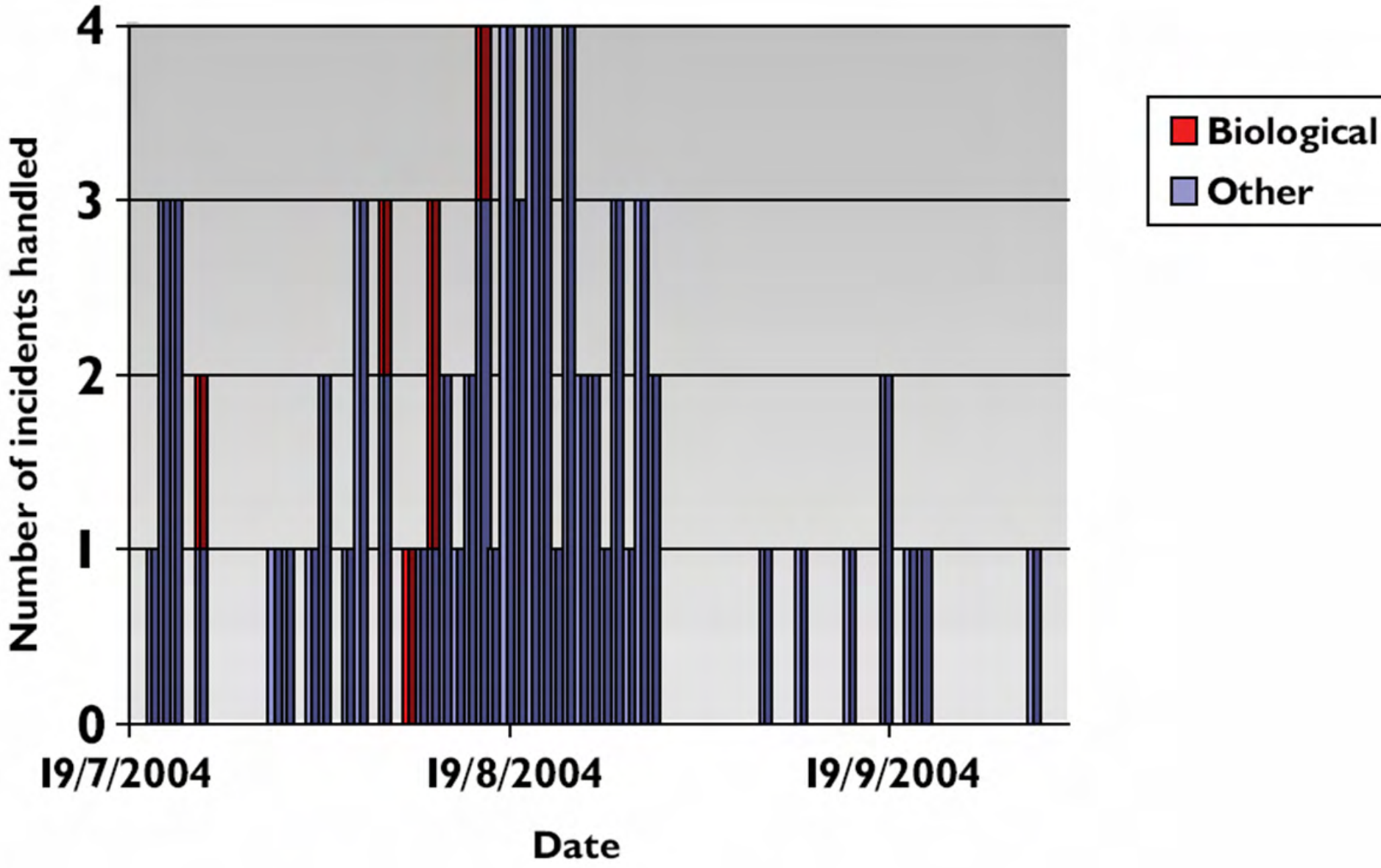
Respiratory infection with fever
Bloody diarrhea
Gastroenteritis (diarrhea, vomiting), without blood
Febrile illness with rash
Meningitis, encephalitis, or unexplained acute encephalopathy / delirium
Suspected viral hepatitis (acute)
Botulism – like syndrome
Lymphadenitis with fever
Sepsis or unexplained shock
Unexplained death with history of fever
Other syndrome of possible interest to Public Health

OUTBREAKS / CBRN

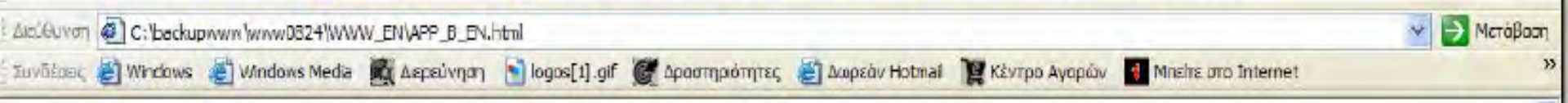
- **14 clusters**
  - **foodborne or waterborne disease**
  - Small n of cases (2-5)
    - Family
- **8 larger outbreaks**
  - **Gastroenteritis**
    - **N = 6-38 cases**
    - **Formal intervention**
- None in the venues

CBRN

- 6 “suspicious” B incidents
  - All included powder
  - 5 in olympic cities, 1 outside the venue
  - All samples neg for high risk bacteria & viruses
- 2 C incidents


4
3
2
1
0
Number of incidents handled
19/7/2004
19/8/2004
19/9/2004
Date
Biological
Other

Daily analysis and review of data



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	%vis	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	0.840143	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)

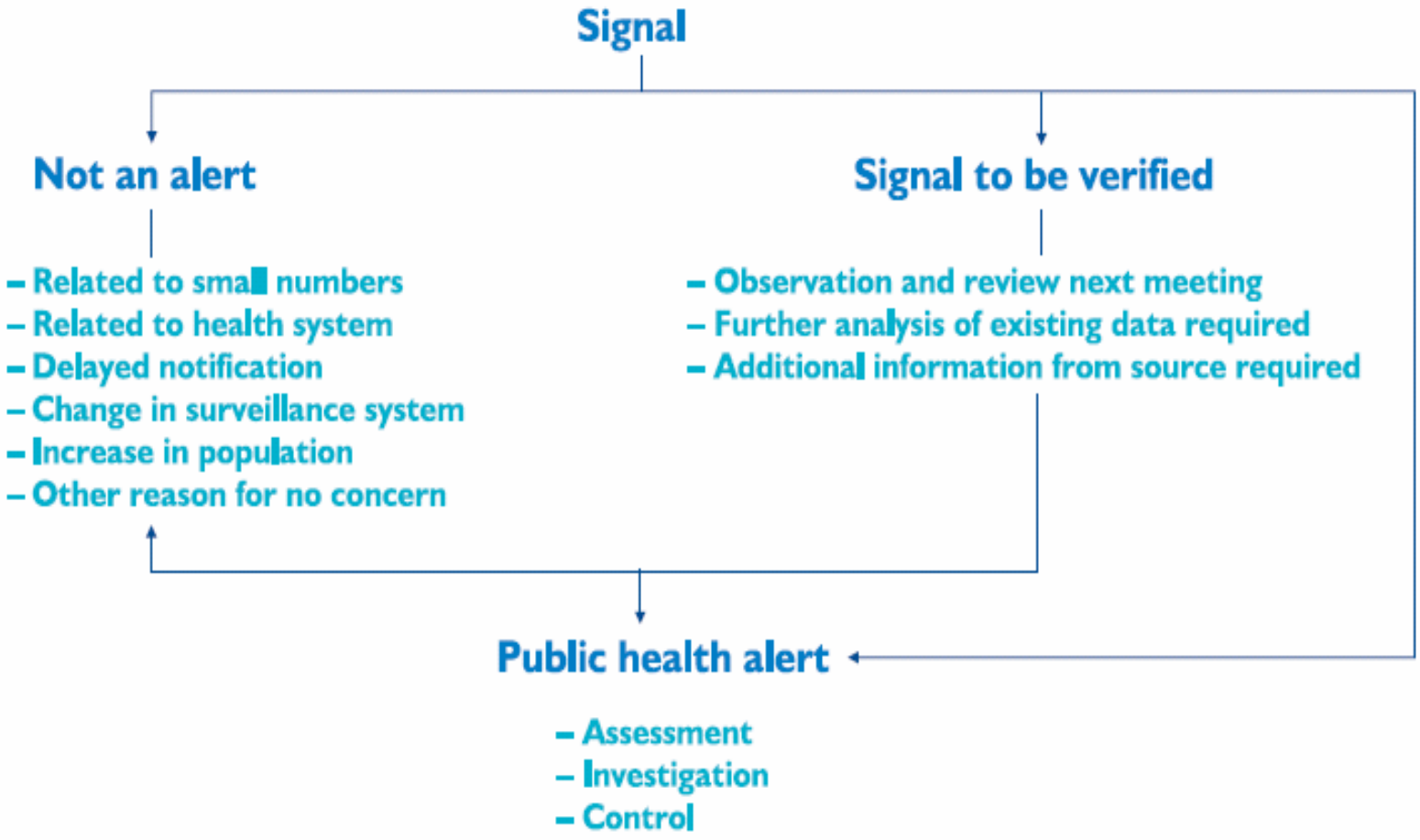
Statistical signals from enhanced OG surveillance, 1-31 August 2004

	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

Fig. I. Flow chart for processing 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

LESSONS LEARNED (1)

- Surveillance systems were enhanced
- A new syndromic surveillance system was incorporated and tested
- Daily reporting was well accepted
  - Not feasible except for large scale gatherings

LESSONS LEARNED (2)

- SOPs for interpreting data and deciding on measures are necessary
  - Translating stat significance in PH action
  - Specialist capacity
  - Training & relations with regional health units
  - International cooperation

LESSONS LEARNED (3)

- The same people and systems involved in routine public health surveillance activities are being used in the surveillance systems aimed at the detection of possible bioterrorism events

LESSONS LEARNED (4)

- Good collaboration with other systems
  - Active, integrated environmental health surveillance system
  - The Health Coordination Command Centre
- The whole experience created significant expertise among the staff of the HCDCP

Questions unanswered

- Daily surveillance report
  - Should it be in the public domain?
- Continuation of Syndromic surveillance as part of the ongoing system
- Poor to no risk assessment for CBRN events

The important thing is not to stop searching and questioning

Aknowledgments

- George Saroglou
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- All the HCDCP staff…


QUESTIONS ?