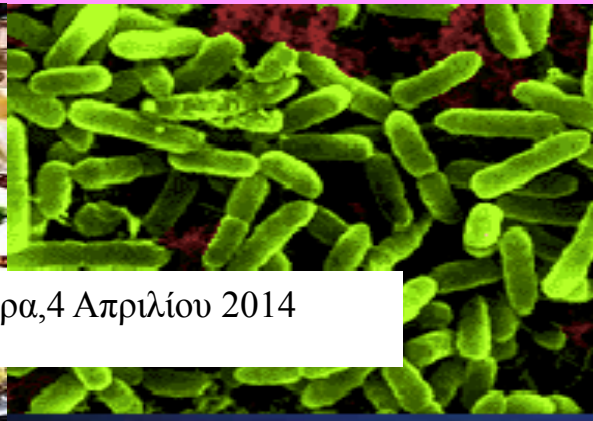
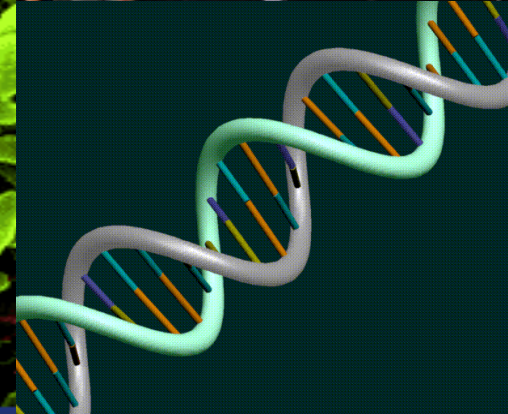


ΜΟΡΙΑΚΗ ΒΙΟΛΟΓΙΑ ΚΑΙ ΤΡΟΦΙΜΟΓΕΝΗ ΝΟΣΗΜΑΤΑ

Μανδηλαρά Γεωργία
Βιολόγος *PhD*,
Επιστημονική Υπεύθυνη
Εθνικού Κέντρου Αναφοράς Σαλμονελλών, Σιγκελλών, παθογόνων
E.coli και λοιπών Εντεροπαθογόνων
Τμήμα Μικροβιολογίας
Εθνική Σχολή Δημόσιας Υγείας – ΚΕΔΥ-ΚΕΕΛΠΝΟ



Κέρκυρα, 4 Απριλίου 2014



PATHOGENIC BACTERIA

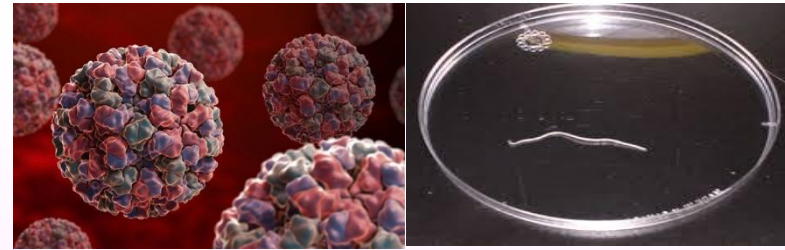
- *Salmonella* spp.
- *Clostridium botulinum*
- *Staphylococcus aureus*
- *Campylobacter jejuni*
- *Yersinia enterocolitica* and *Yersinia pseudotuberculosis*
- *Listeria monocytogenes*
- *Vibrio cholerae* O1
- *Vibrio cholerae* non-O1
- *Vibrio parahaemolyticus* and other vibrios
- *Vibrio vulnificus*
- *Clostridium perfringens*
- *Bacillus cereus*
- *Aeromonas hydrophila* and other spp.
- *Plesiomonas shigelloides*
- *Shigella* spp.
- Miscellaneous enterics (*Klebsiella*, *Enterobacter*, *Proteus*, *Citrobacter*, *Aerobacter*, *Providencia*, *Serratia*)
- *Streptococcus*

ENTEROVIRULENT ESCHERICHIA COLI GROUP (EEC Group)

- *Escherichia coli* - enterotoxigenic (ETEC)
- *Escherichia coli* - enteropathogenic (EPEC)
- *Escherichia coli* O157:H7 enterohemorrhagic (EHEC)
- *Escherichia coli* - enteroinvasive (EIEC)

Λοιμώξεις

Τοξινώσεις (τροφικές δηλητηριάσεις) – [Intoxination]



PARASITIC PROTOZOA and WORMS

- *Giardia lamblia*
- *Entamoeba histolytica*
- *Cryptosporidium parvum*
- *Cyclospora cayentanensis*
- *Anisakis* sp. and related worms
- *Diphyllobothrium* spp.
- *Nanophyetus* spp.
- *Eustrongylides* sp.
- *Acanthamoeba* and other free-living amoebae
- *Ascaris lumbricoides* and *Trichuris trichiura*

VIRUSES

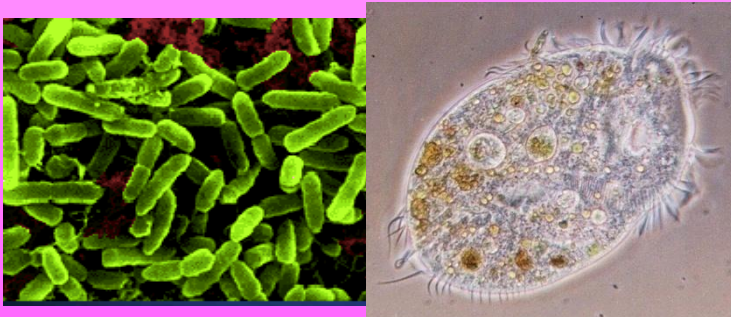
- Hepatitis A virus
- Hepatitis E virus
- Rotavirus
- Norwalk virus group
- Other viral agents

NATURAL TOXINS

- Ciguatera poisoning
- Shellfish toxins (PSP, DSP, NSP, ASP)
- Scombroid poisoning
- Tetrodotoxin (Pufferfish)
- Mushroom toxins
- Aflatoxins
- Pyrrolizidine alkaloids
- Phytohaemagglutinin (Red kidney bean poisoning)
- Grayanotoxin (Honey intoxication)

OTHER PATHOGENIC AGENTS

- Prions



- Αρχές 20^{ου} αιώνα

Μολυσμένα τρόφιμα, γάλα, νερό → τ.ν

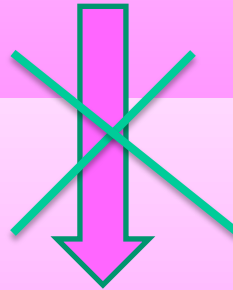
- Επανάσταση συνθήκες υγιεινής

Αποχέτευση / επεξεργασία νερού

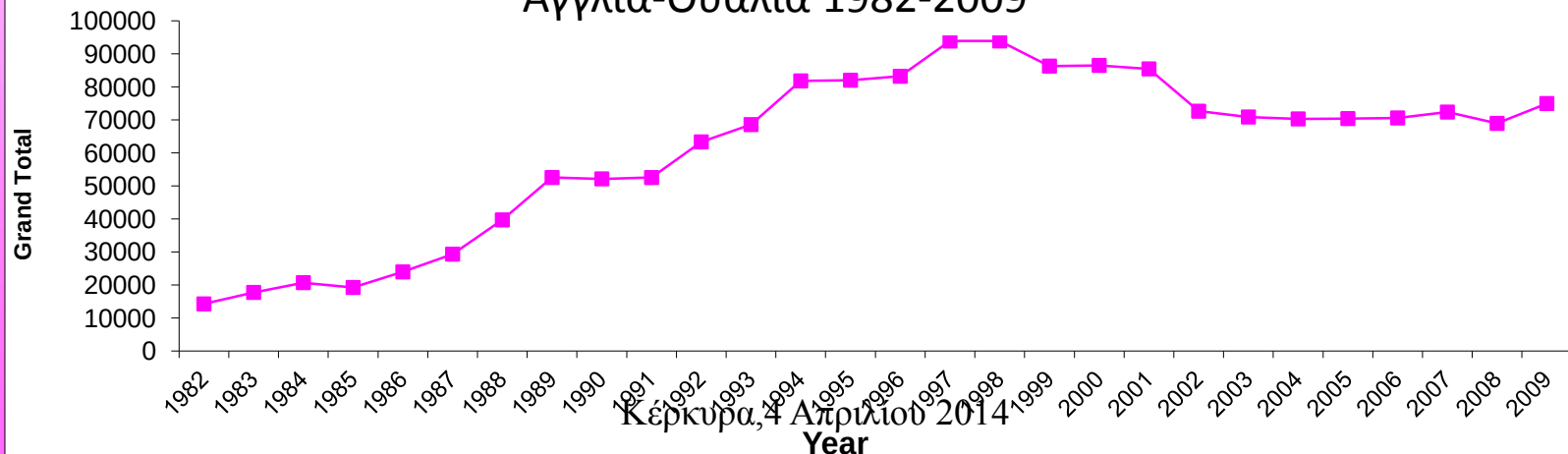
Πλύσιμο χεριών

Παστερίωση γάλακτος-1908

Οικιακά ψυγεία-1913



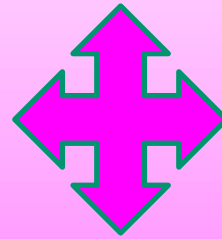
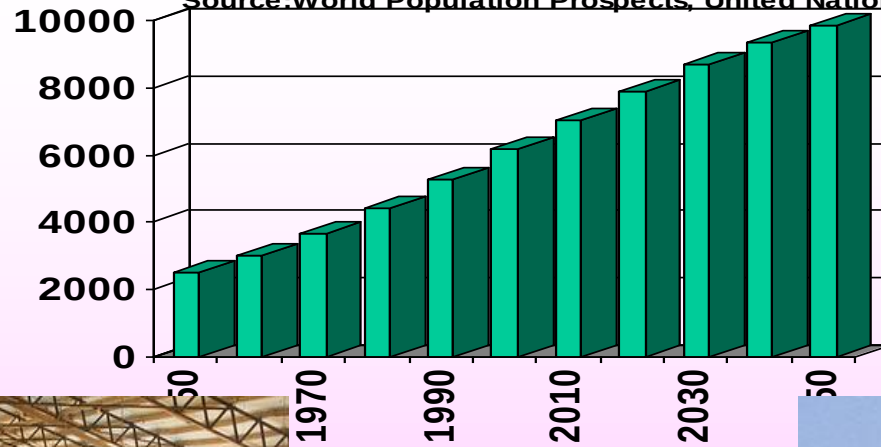
Τροφιμογενή νοσήματα Αγγλία-Ουαλία 1982-2009



Growth of World Population (total)

(million)

Source: World Population Prospects, United Nations



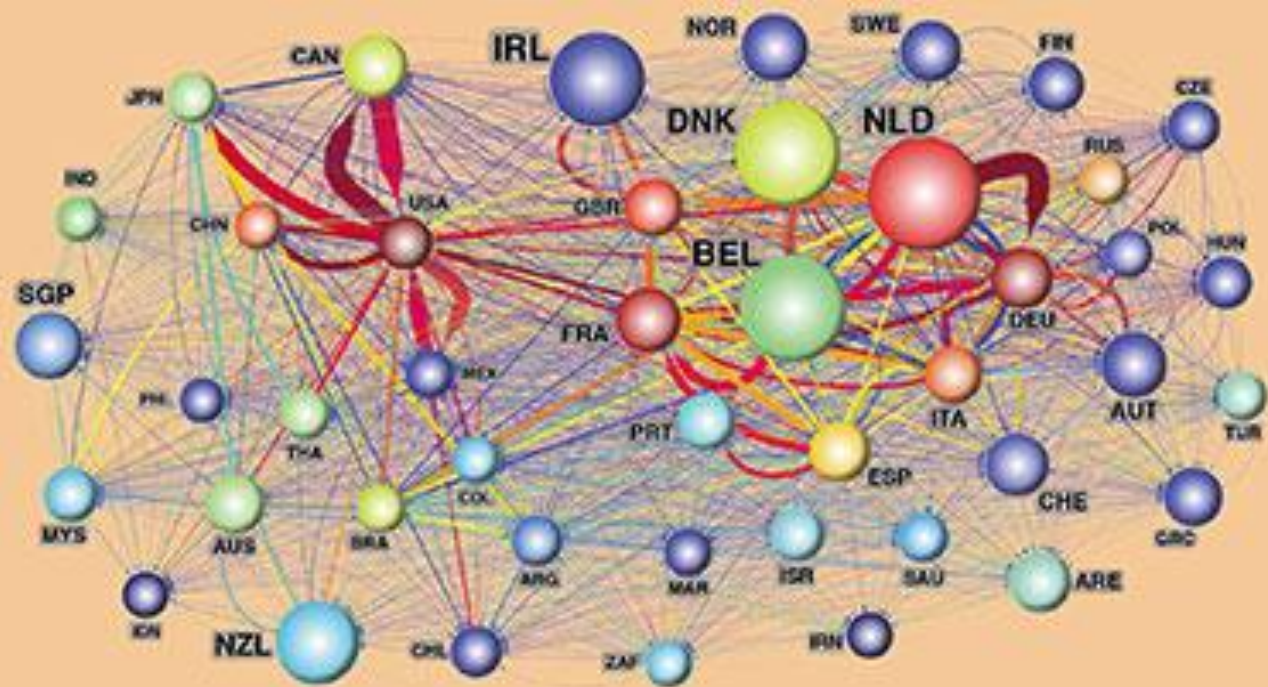
Animal manures are often a source of contamination



Human pathogenic bacteria can be carried by farm animals. The bacteria can enter plants through stomates or wounds. Contamination MUST be avoided, because washing does not remove the pathogens that are inside the plant tissues.



Κέρκυρα, 4 Απριλίου 2014



Globalisation of Trade : “The World on your Plate”

Chicken Kiev



Herb Butter:

Salted butter - Ireland
Garlic puree - China, USA, Spain
Garlic salt - China, USA, Spain
Lemon juice - USA
Parsley - France, UK
Pepper - Indonesia
Water - Ireland

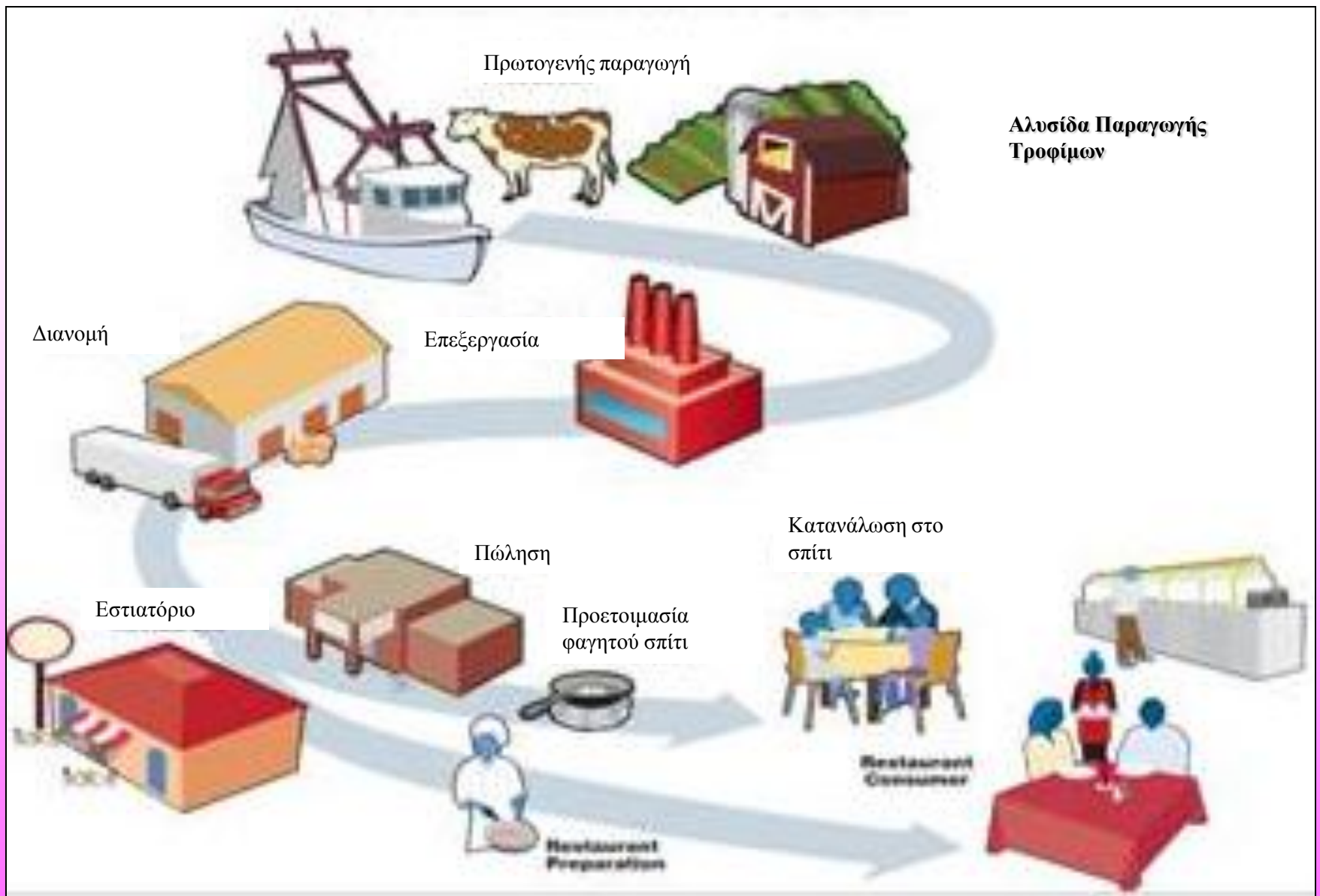
Chicken Breast: Chicken - Ireland, Belgium
UK, France etc.

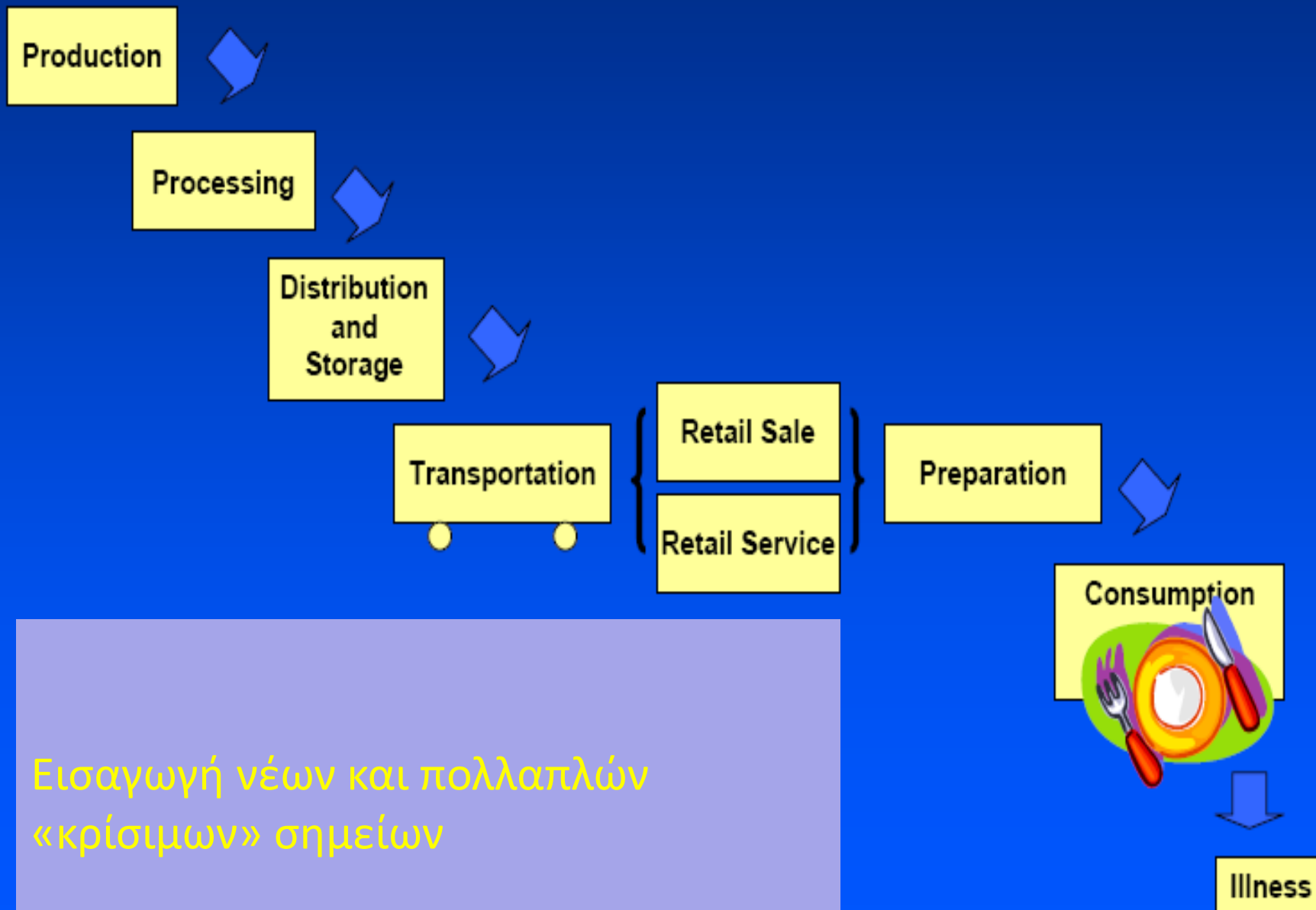
Batter: Flour - Belgium, France
Water - Ireland

Bread Crumb: Bread crumb - Ireland, UK
Rape-seed oil - EU, Australia
Eastern Europe

Courtesy A. Reilly, FSAI, Ireland

Κέρκυρα, 4 Απριλίου 2014

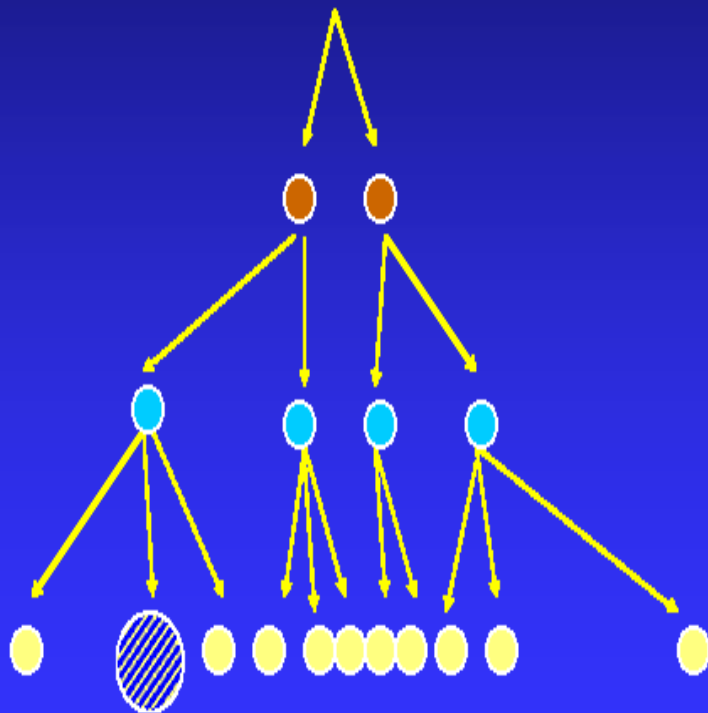




Εισαγωγή νέων και πολλαπλών
«κρίσιμων» σημείων



Farm



Focused outbreak

εστιασμένη

Production



Processing

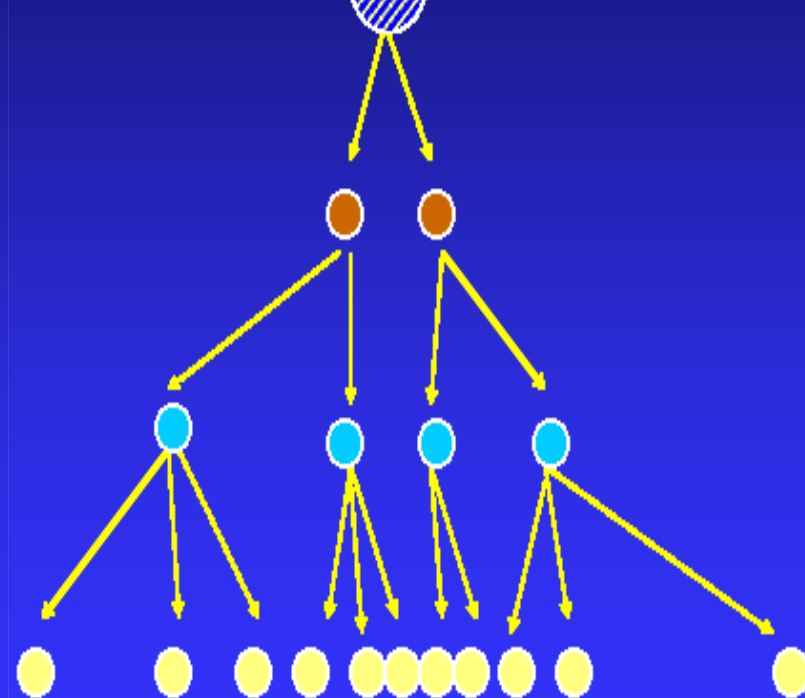


Distribution



Final preparation and cooking

Farm



Diffuse outbreak

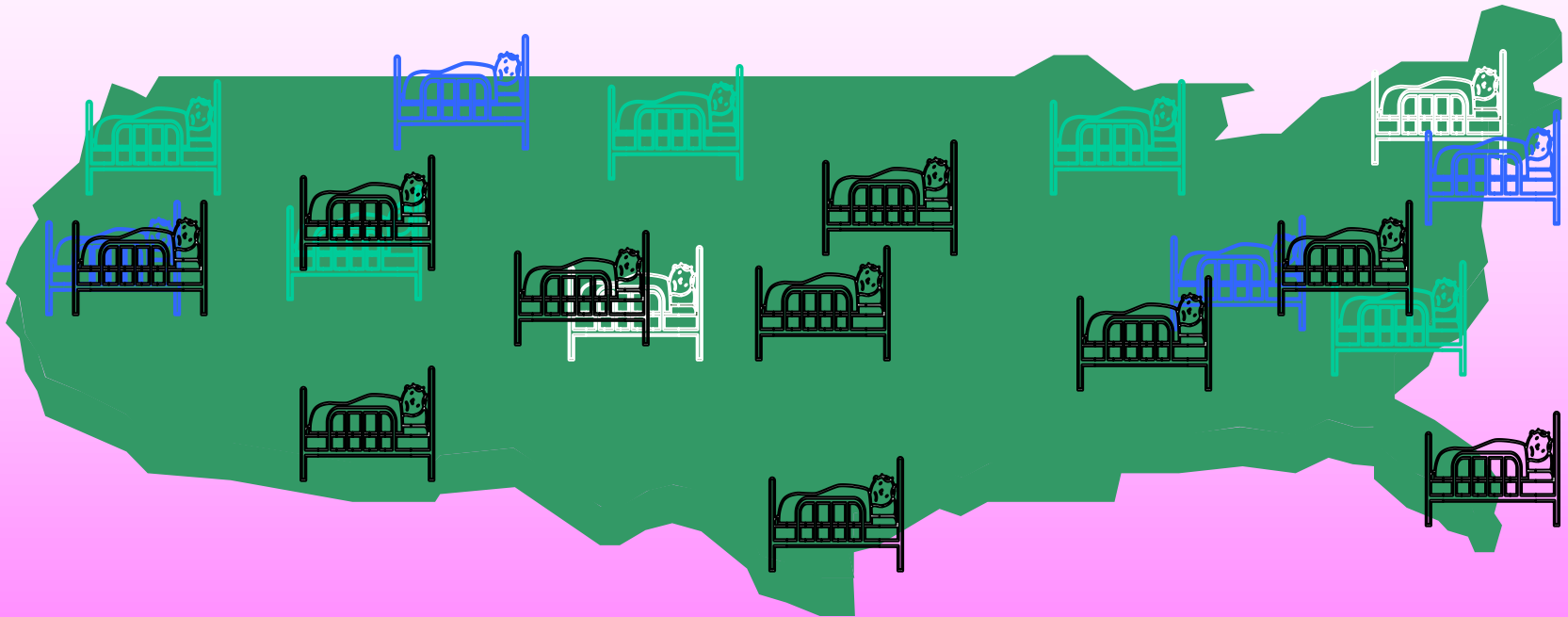
διάσπαρτη

Μια μεγάλη εστιασμένη επιδημία μπορεί να είναι εμφανής.....

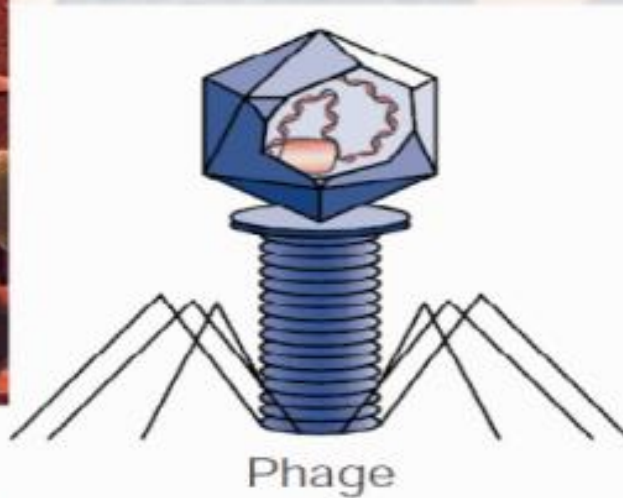
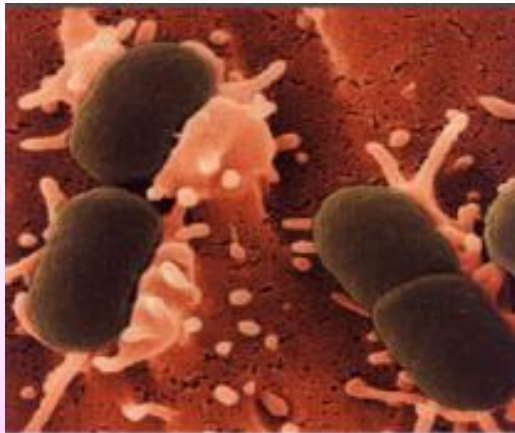


Κέρκυρα, 4 Απριλίου 2014

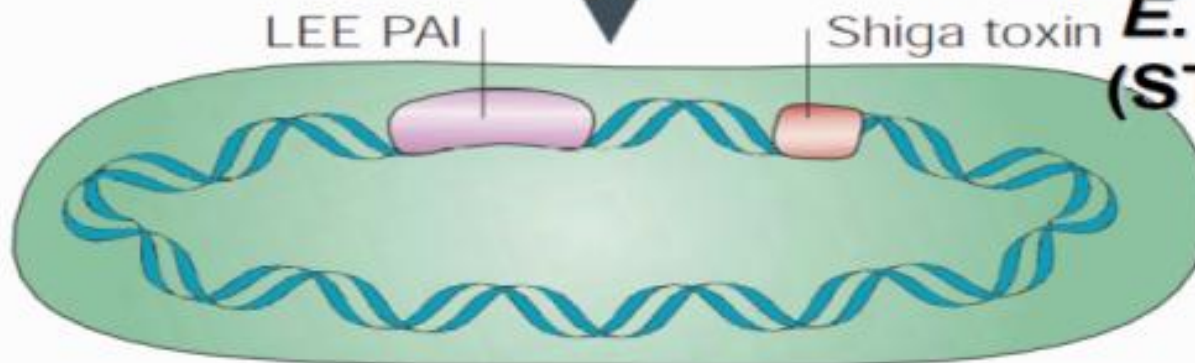
**Μια επιδημία με κρούσματα διάσπαρτα
γεωγραφικά ... χρονικά.....δύσκολα
διερευνάται..εκτός αν:**



➤ **Απομόνωση παθογόνου από όλα τα κρούσματα**



Vero
cytotoxin
producing
E. coli
(VTEC)
or
Shiga toxin-
producing
E. coli
(STEC)



Record-High Antibiotic Sales for Meat and Poultry Production

Antibiotic overuse is breeding new, resistant strains of bacteria that infect people. But industrial farms haven't gotten the message.

In 2011, 29.9 million pounds of antibiotics were sold in the United States for meat and poultry production.

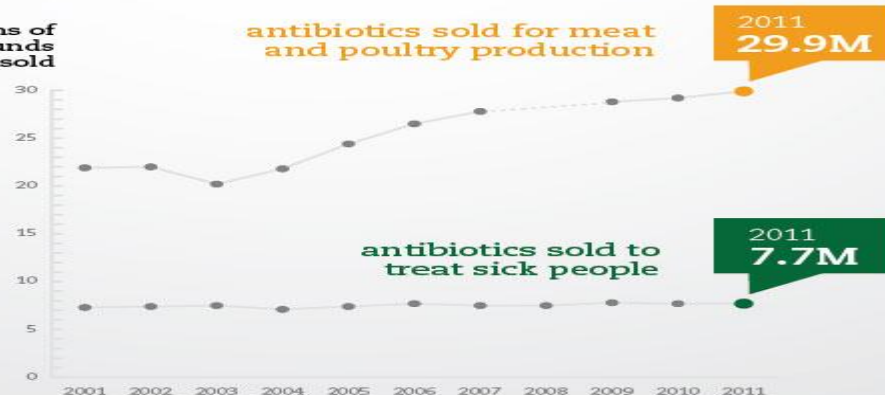
3.9 times greater

Yet, in the same period, only 7.7 million pounds of antibiotics were sold to treat sick people in the United States.



ON THE RISE

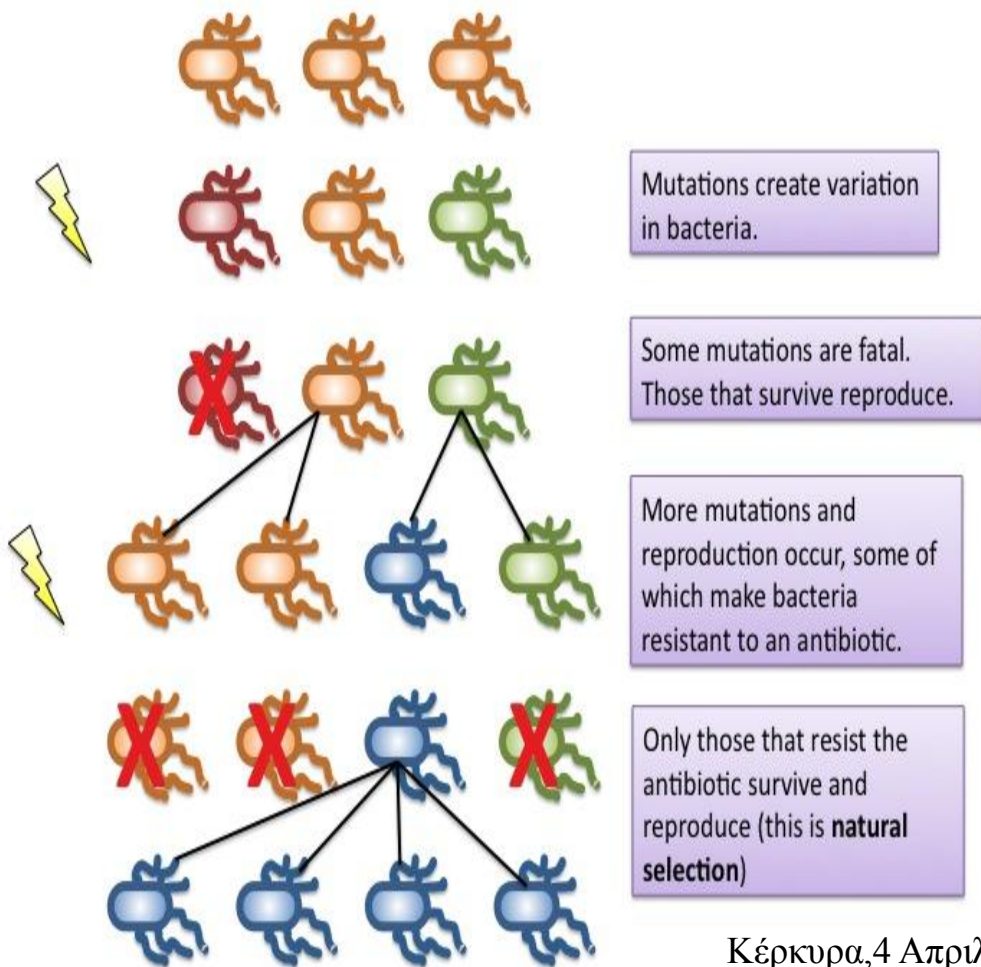
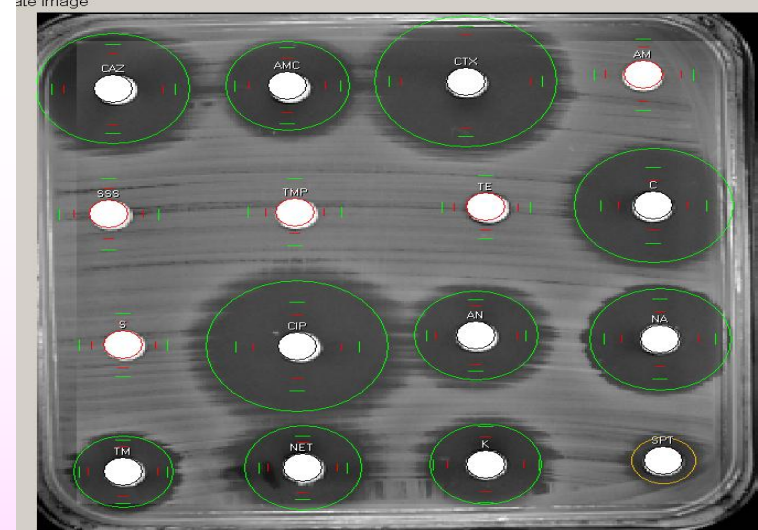
millions of pounds sold



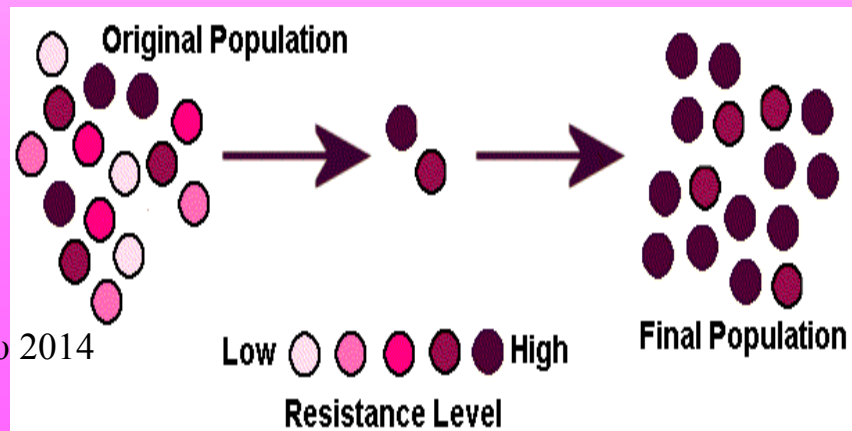
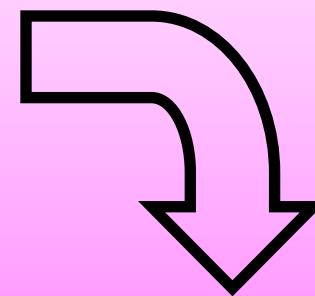
We need more detailed information on how antibiotics are being used to make animals grow faster and to compensate for overcrowded and unsanitary conditions.

Κέρκυρα, 4 Απριλίου 2014

Salmonella monophasic Typhimurium

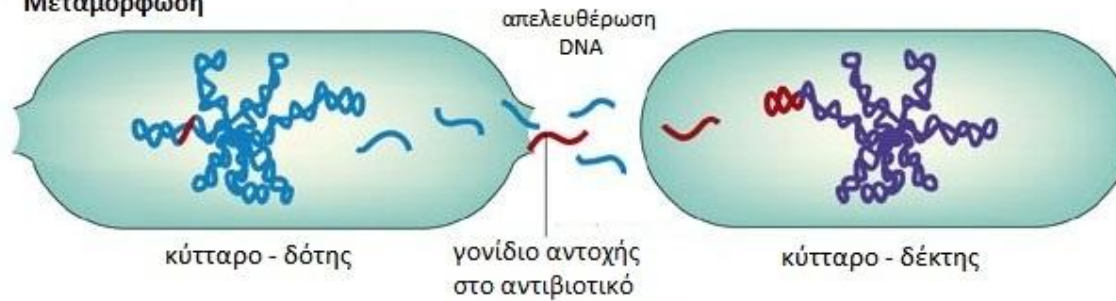


Κέρκυρα, 4 Απριλίου 2014

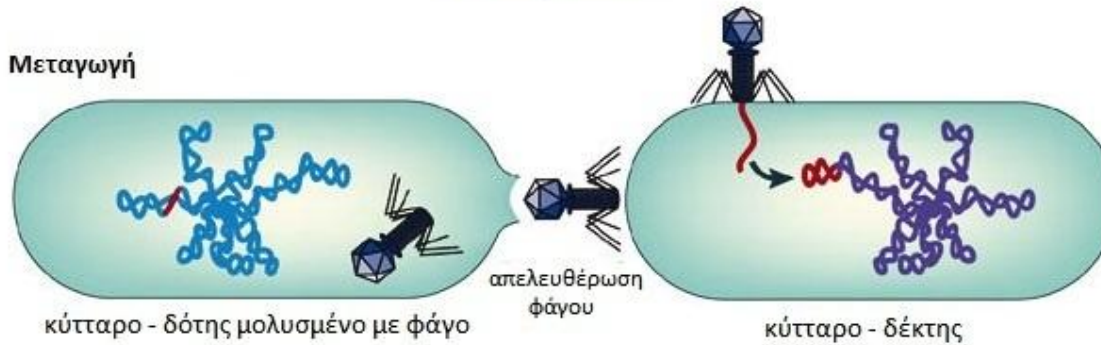


Οριζόντια μεταφορά γενετικού υλικού

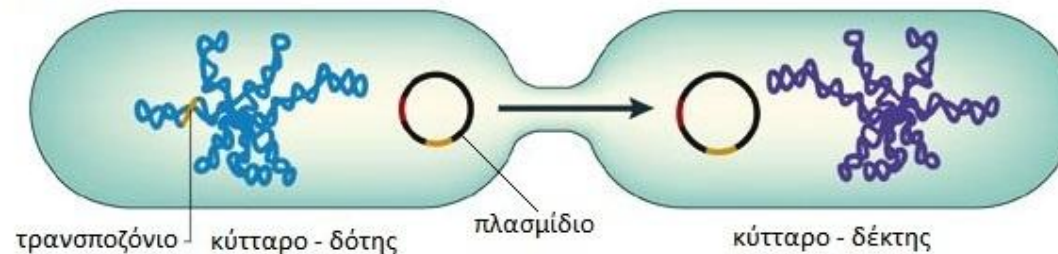
Μεταμόρφωση



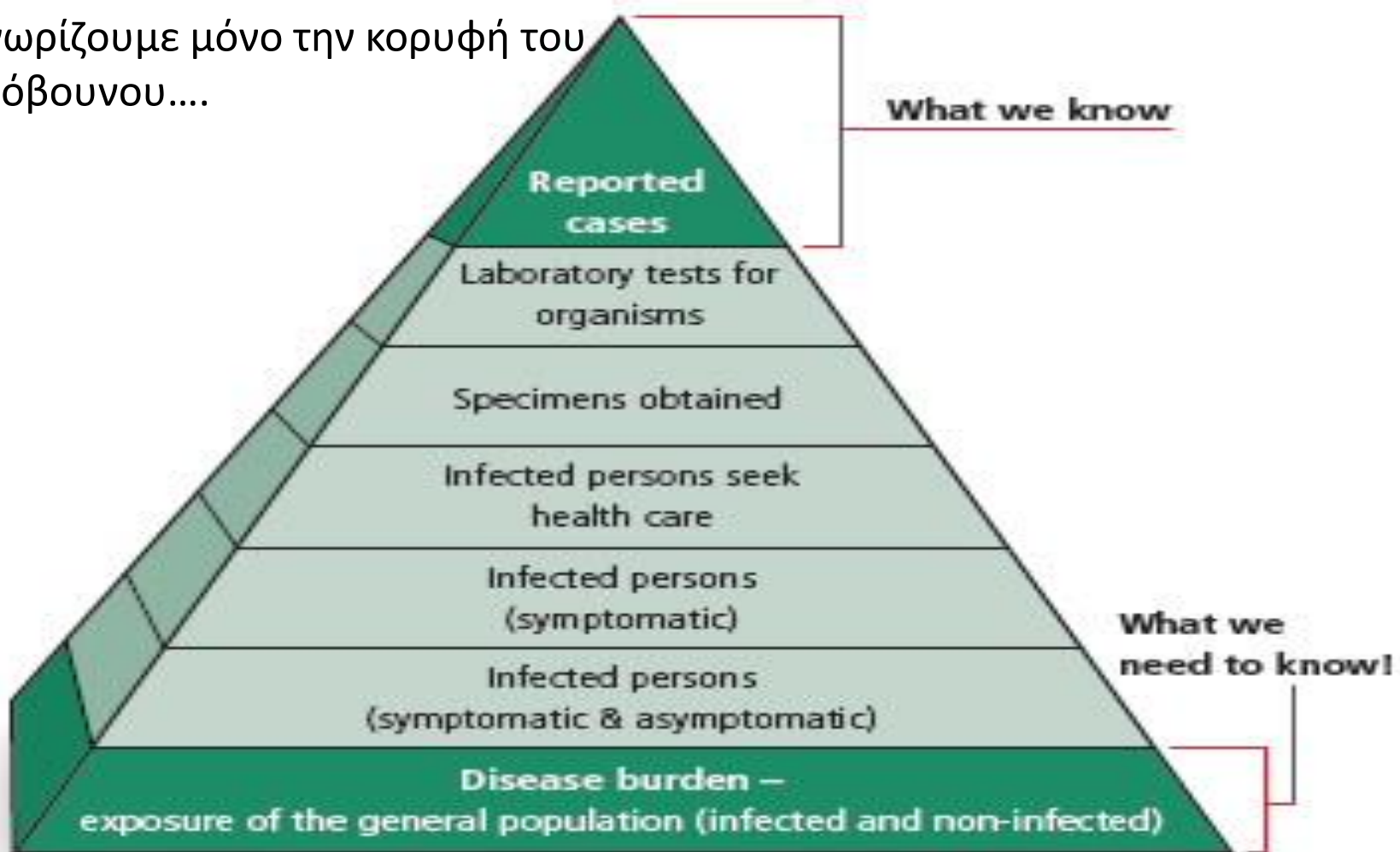
Μεταγωγή



Σύζευξη



...γνωρίζουμε μόνο την κορυφή του παγόβουνου....

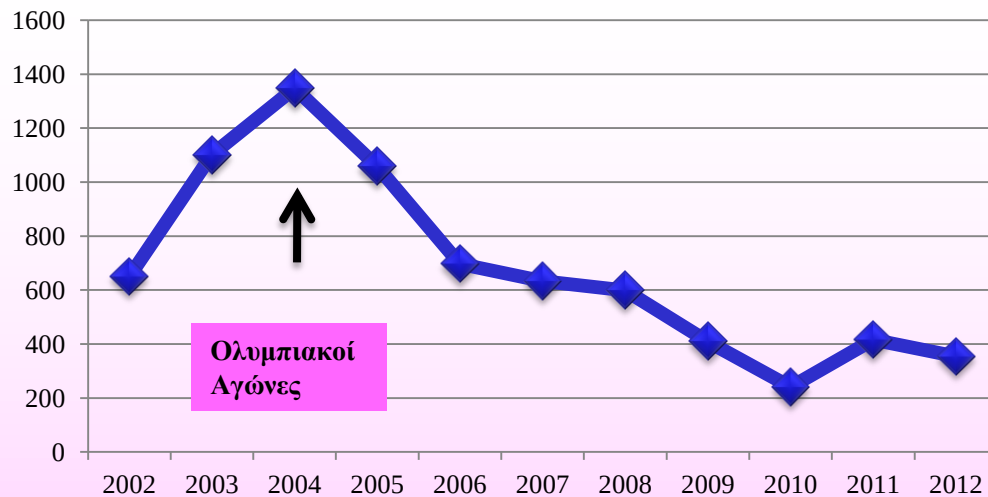


Source: WHO INFOSAN

→ υποδήλωση τροφιμογενών νοσημάτων

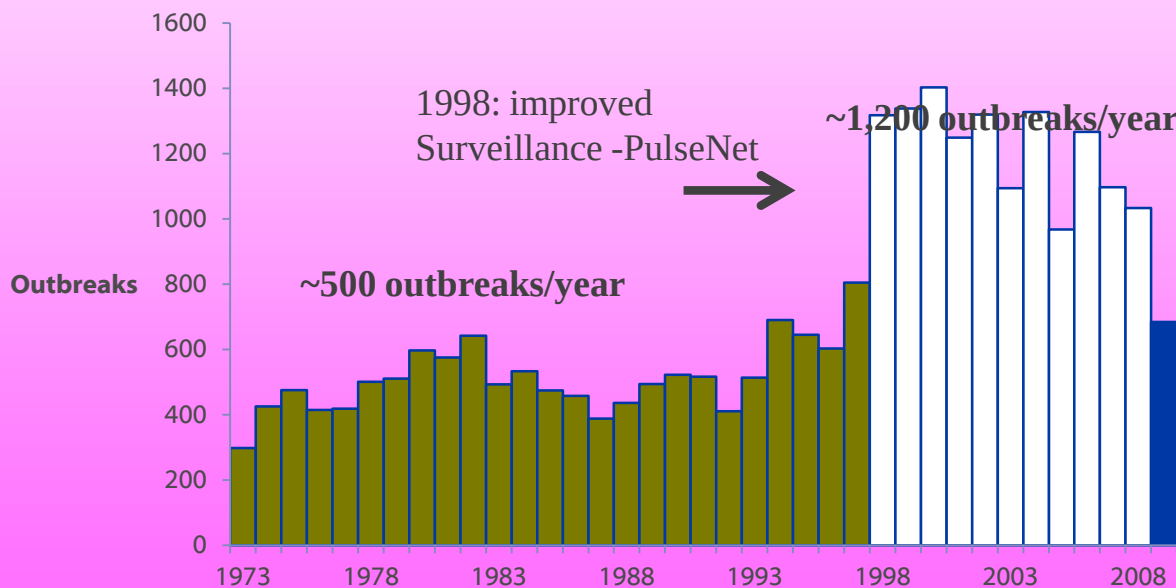
→ καινοτόμες προσεγγίσεις (ενεργητική επιδημιολογική επιτήρηση, εκτίμηση κινδύνου, επιδημιολογικά μοντέλα)

Κέρκυρα, 4 Απριλίου 2014



Εθνικό Κέντρο Αναφοράς Σαλμονελλών *Salmonella* spp. 2002-2012

◆ *Salmonella* spp.



Τροφιμογενείς επιδημίες ΗΠΑ, 1973–2009





EU summary report on zoonoses, zoonotic agents and food-borne outbreaks 2012

Figure SU1. Reported notification rates of zoonoses in confirmed human cases^{1,2} in the EU, 2012

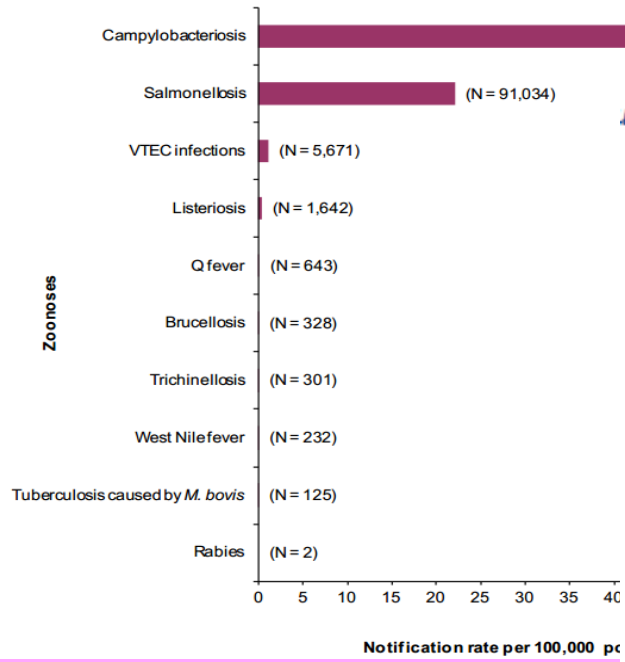
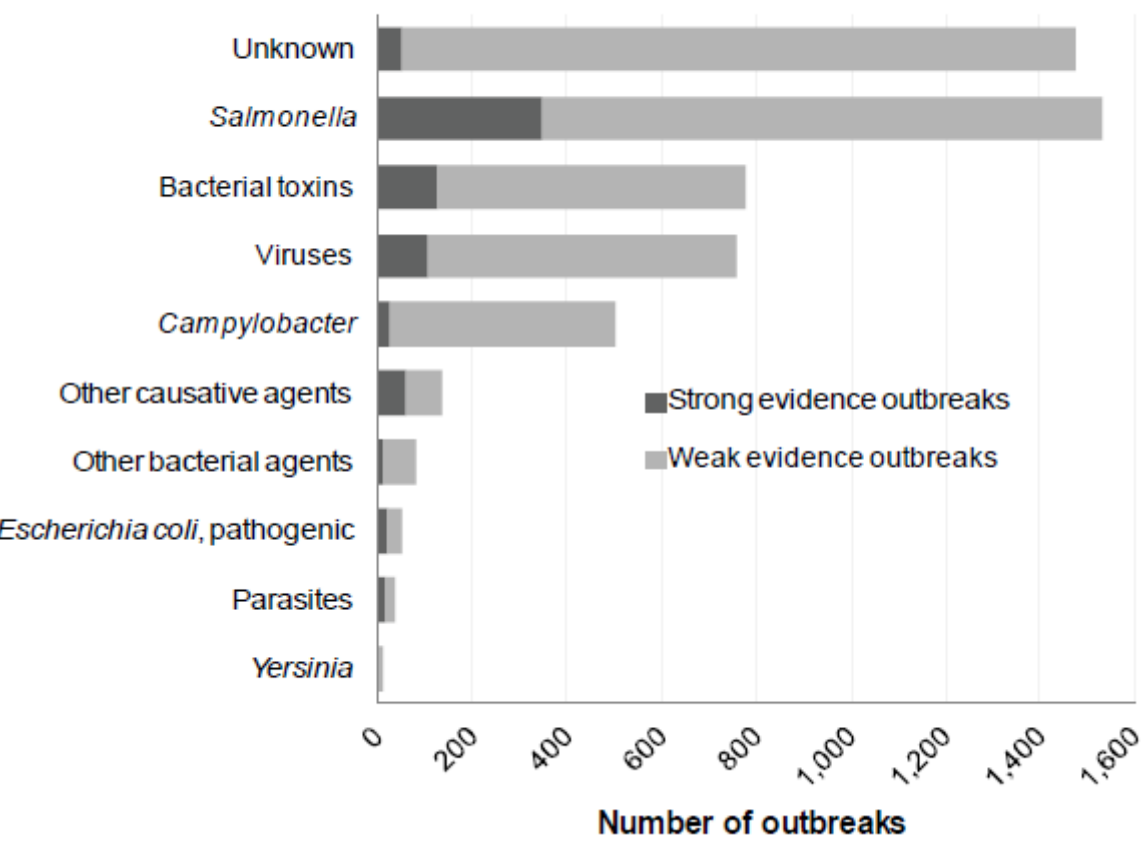


Figure SU2. Distribution of zoonotic agents and food-borne outbreaks in 2012

Approved on 22 January 2014
Published on 19 February 2014

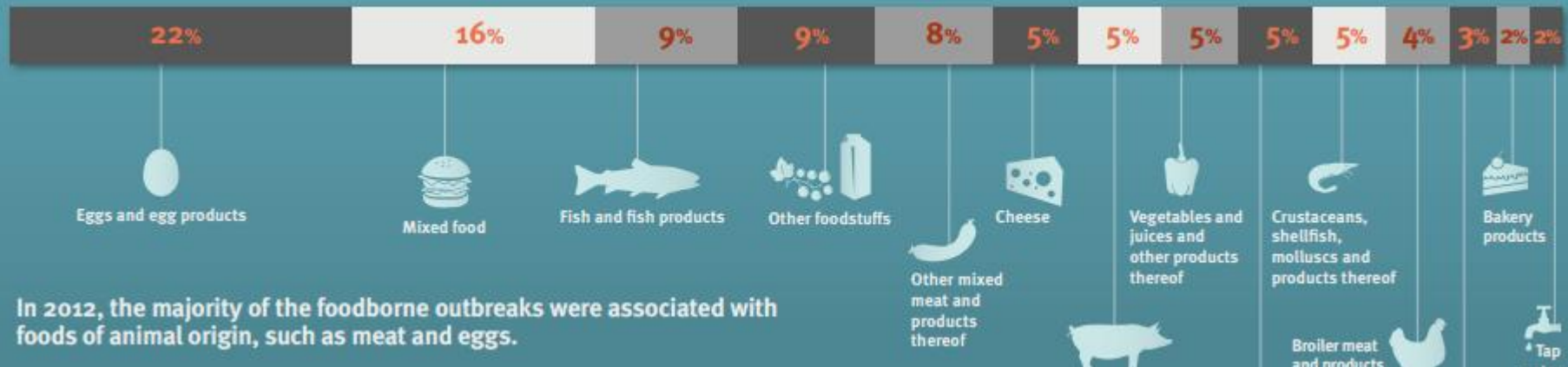


Zoonoses

Zoonoses are diseases that can be transmitted directly or indirectly between animals and humans, for instance by consuming contaminated foodstuffs or through contact with infected animals. Most zoonotic infections have mild symptoms and do not require medical treatment. However, they can also turn into life-threatening conditions.

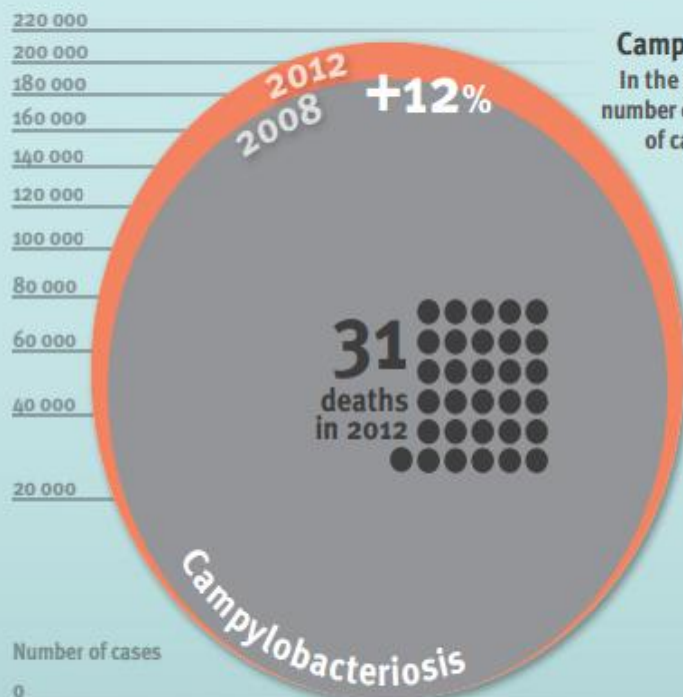


Food types causing outbreaks in the EU in 2012



Most common zoonoses

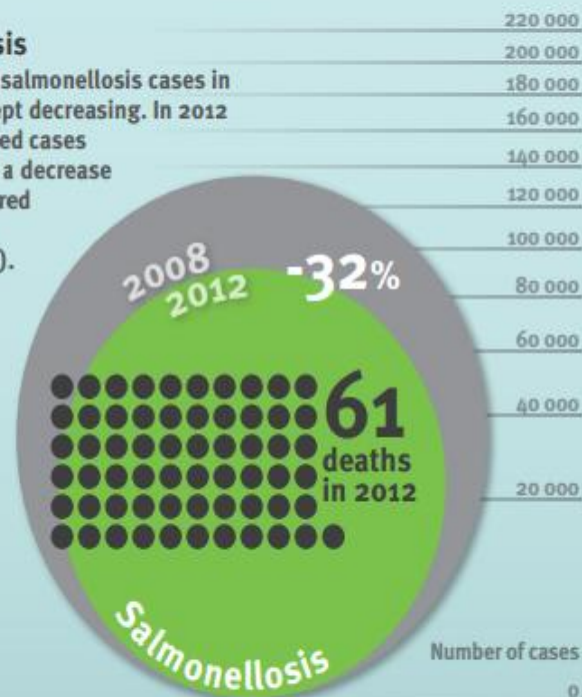
In the European Union in 2012, the most common zoonotic infections in humans were campylobacteriosis and salmonellosis.



Salmonellosis

The number of salmonellosis cases in humans has kept decreasing. In 2012 91 034 confirmed cases were reported, a decrease by 32% compared with 2008 (134 580 cases).

Salmonella is mostly found in poultry meat and pork.



Trends of 8 zoonoses in humans over the last 5 years

Data from 2008 to 2012



Prevention and control

In order to prevent zoonoses from occurring, it is important to identify which animals and foodstuffs are the main sources of infections. The European Centre for Disease Prevention and Control (ECDC) and the European Food Safety Authority (EFSA) analyse the information submitted by Member States on human cases and prevalence of zoonotic agents in animals and food, and publish an annual joint report.

Source: European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic agents and Food-borne Outbreaks in 2012, published by EFSA & ECDC in 2014



3,000 die of
CDC, 2011

1 in 6

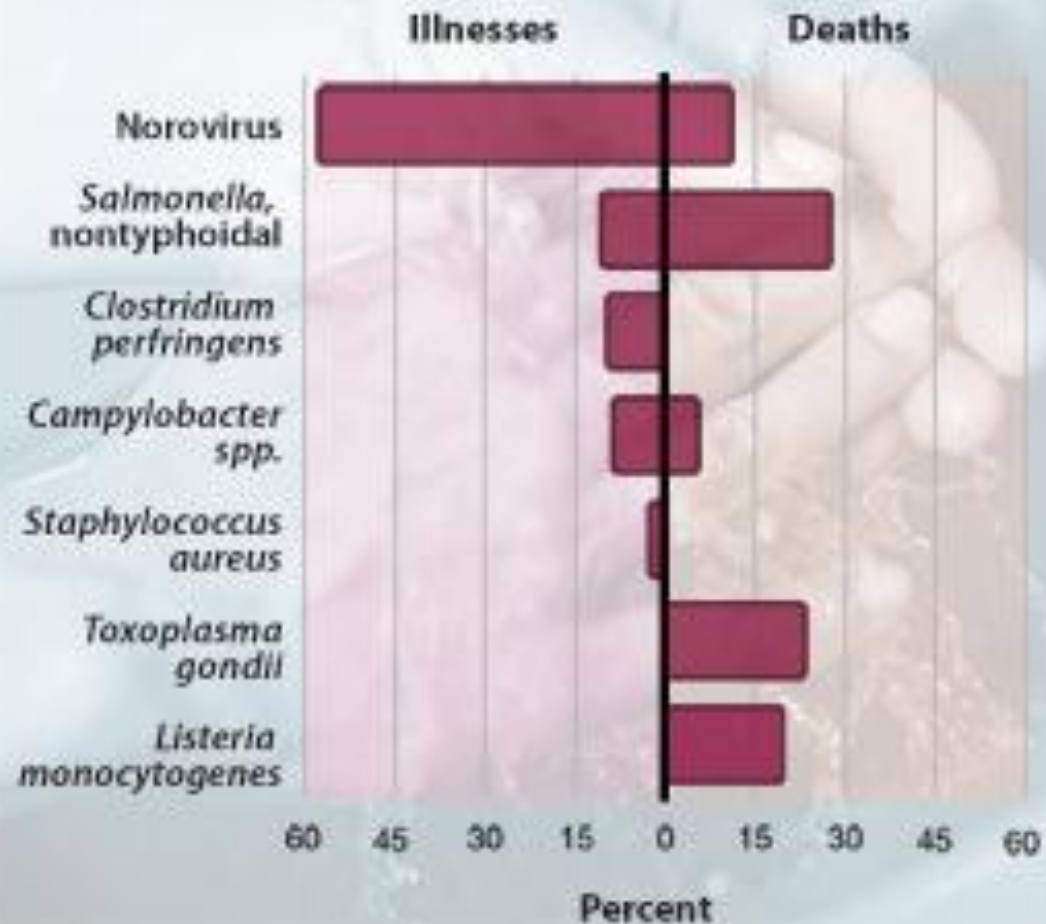
1 in 6 

Pathogen	Estimated number of hospitalizations	90% Credible Interval	%
<i>Salmonella</i> , nontyphoidal	19,336	8,545–37,490	35
<i>Norovirus</i>	14,663	8,097–23,323	26
<i>Campylobacter</i> spp.	8,463	4,300–15,227	15
<i>Toxoplasma gondii</i>	4,428	3,060–7,146	8
<i>E.coli</i> (STEC) O157	2,138	549–4,614	4
Subtotal			88

Listeria monocytogenes (ηλικιωμένους – έγκυες γυναίκες) → θνητότητα 20-30%

Pathogen	Estimated number of deaths	90% Credible Interval	%
<u>Salmonella</u> , nontyphoidal	378	0–1,011	28
<u>Toxoplasma gondii</u>	327	200–482	24
<u>Listeria monocytogenes</u>	255	0–733	19
<u>Norovirus</u>	149	84–237	11
<u>Campylobacter spp.</u>	76	0–332	6
Subtotal			88

Top pathogens contributing to domestically acquired foodborne illnesses and deaths, 2000–2008



CDC

Επιτήρηση τροφιμογενών νοσημάτων στην Ελλάδα – Σύστημα Υποχρεωτικής Δήλωσης Νοσημάτων (ΚΕΕΛΠΝΟ)

Νόσημα	Αριθμός δηλωθέντων κρουσμάτων							
	2003	2004	2005	2006	2007	2008	2009	2010
Σαλμονέλλωση (μη τύφο- παρατυφική)	1037	1433	1230	975	731	814	408	300
Ηπατίτιδα Α	77	72	180	131	297	128	88	58
Σιγκέλλωση	16	64	26	30	49	19	37	33
Τυφοειδής πυρετός/ παράτυφος	0	20	19	16	18	11	4	10
Λιστερίωση	1	3	8	7	10	1	4	9
Λοίμωξη ΕΗΕC*	2	2	0	1	1	0	0	1
Τριχίνωση	0	0	0	0	0	0	2	4
Αλλαντίαση	0	0	0	0	0	0	0	0
Χολέρα	0	0	0	0	0	0	0	0
* Λοίμωξη από εντεροαιμορραγικό κολοβακτηρίδιο								

Κέρκυρα, 4 Απριλίου 2014

Εθνικό Κέντρο Αναφοράς Σαλμονελλών-Σιγκελλών και VTEC (ΕΚΑΣΣ)

-  **παραλαβή** στελεχών μικροβίων & επιδημιολογικών δελτίων από δημόσια και ιδιωτικά νοσηλευτικά ιδρύματα
-  **ταυτοποίηση** → βιοχημική
-  **τυποποίηση** → οροτυποποίηση
→ μοριακή τυποποίηση (Pulsed Field Gel Electrophoresis)
-  **έλεγχος αντοχής** σε αντιβιοτικά (www.mednet/whonet.gr)
-  Διαπίστευση των μεθόδων οροτυποποίησης σαλμονελλών και ελέγχου αντοχής σε αντιβιοτικά / PFGE από τον ΕΣΥΔ (ISO/IEC 17025)
-  Ανίχνευση γονιδίων τοξινών (ISO/IEC 17025) και οροτυποποίηση με PCR σε VTEC
-  Ανίχνευση γονιδίων λοιμογονικότητας σε άλλου παθότυπους *E.coli*
-  **τράπεζα στελεχών** από 1996 – σήμερα
-  **αποστολή** αποτελεσμάτων
-  **κοινοποίηση** αποτελεσμάτων σε: μικροβιολογικό εργαστ., ΚΕΕΛΠΝΟ (Γραφείο Τροφιμογενών Νοσημάτων) / ECDC / Υπουργείο Υγείας

ΜΟΡΙΑΚΗ ΒΙΟΛΟΓΙΑ και ΤΡΟΦΙΜΟΓΕΝΕΙΣ ΛΟΙΜΩΞΕΙΣ

Ανίχνευση-Απομόνωση-Ταυτοποίηση - Τυποποίηση

Καλλιέργεια μ/ο

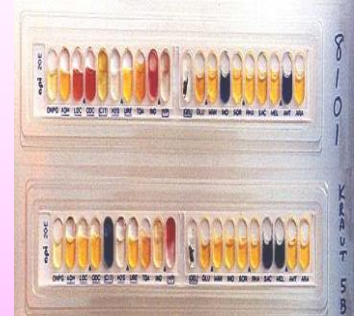
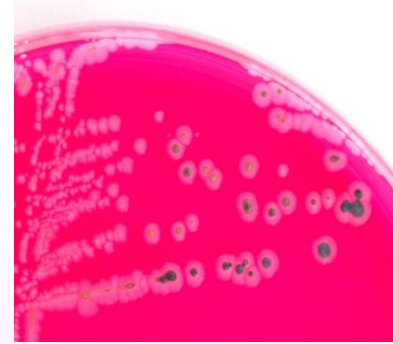
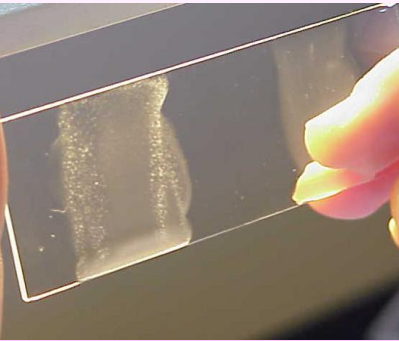
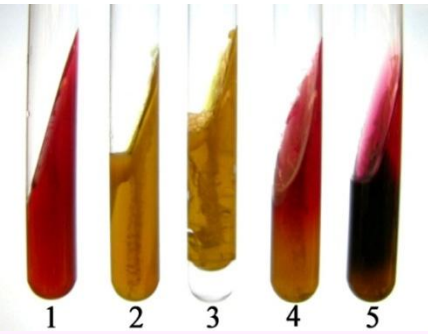
Απομόνωση

Βιοχημικές ιδιότητες (ταυτοποίηση)

Οροτυποποίηση (τυποποίηση)

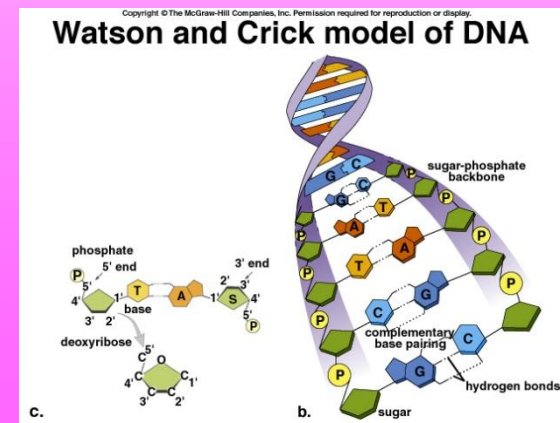
Λυσιτυπία

Αντιβιογράμμα



Φαινοτυπικές → γονοτυπικές μεθόδους = άμεση ανίχνευση γενετικού υλικού DNA/RNA

Π.χ. γονίδιο παραγωγής τοξινών των VTEC
γονίδιο παραγωγής γλουκουρονιδάσης
γονίδιο αντοχής σε ένα αντιβιοτικό



Ταυτοποίηση (=identification) ≠Τυποποίηση (=typing)



κατάταξη σε είδος



κάτω από το επίπεδο είδος/υποείδος

Φαινοτυπική ή/και γονοτυπική ανάλυση βακτηριακών καλλιεργημάτων με σκοπό την παραγωγή **αποτυπώματος (fingerprint)** ειδικό για κάθε στέλεχος ή κλώνο

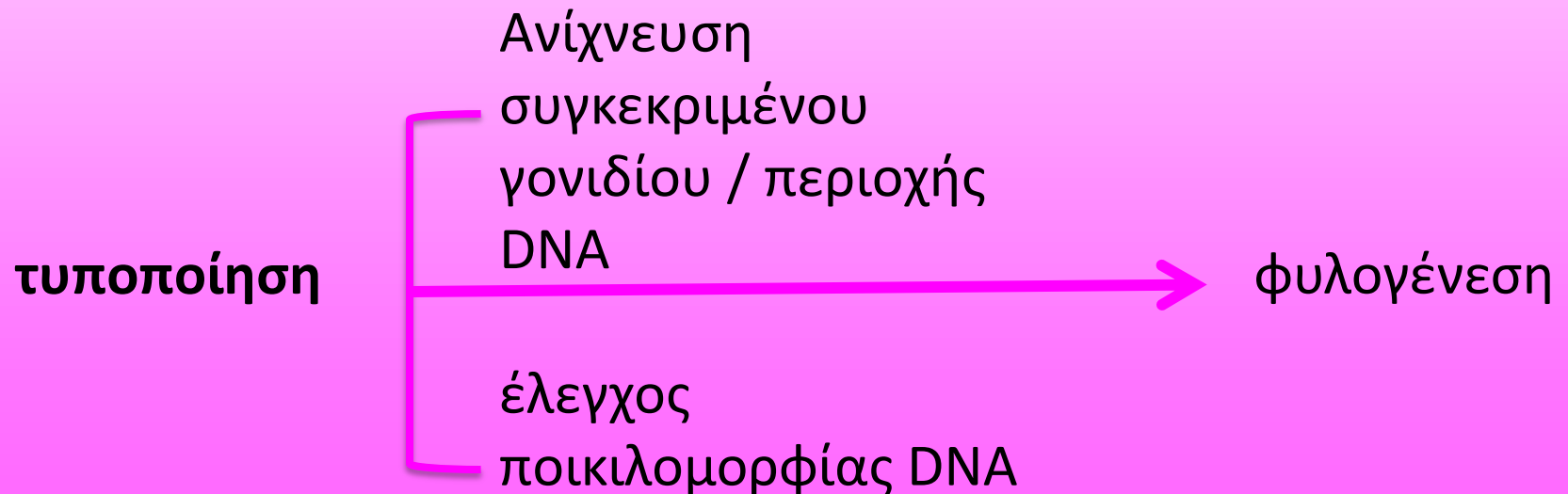
(Ταξινομική) βαθμίδα	Παράδειγμα
Οικογένεια	Enterobacteriaceae
Γένος	<i>Salmonella</i>
Είδος	<i>Salmonella enterica</i>
Υποείδος	<i>Salmonella enterica enterica</i>
Τύπος	4,5:i:1,2 (ορότυπος Typhimurium)
	PT104 (λυσίτυπος)
	STYXB0120 (PFGE profile)
Στέλεχος (strain)	Επιδημία
Καλλιέργημα (isolate)	Ασθενής επιδημίας

Μοριακές τεχνικές ταυτοποίησης / τυποποίησης

- Polymerase Chain Reaction (PCR)
- Real-Time PCR
- Reverse-Transcription PCR
- Pulsed Field Gel Electrophoresis (PFGE)
- Multiple-Locus Variable number tandem repeat Analysis (MLVA)
- Multi Locus Sequence Typing (MLST)
- WGS μέθοδοι (Whole Genome Sequencing)

■ Προτυποποιημένες μέθοδοι για κάθε μικροοργανισμό

■ Διεργαστηριακά σχήματα ποιοτικού ελέγχου





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Food

[Home](#) [Food](#) [Science & Research \(Food\)](#) [Whole Genome Sequencing Program \(WGS\)](#)

Science & Research (Food)

Whole Genome Sequencing Program (WGS)

[Projects](#)

[Research](#)

[Events](#)

Whole Genome Sequencing Program (WGS)

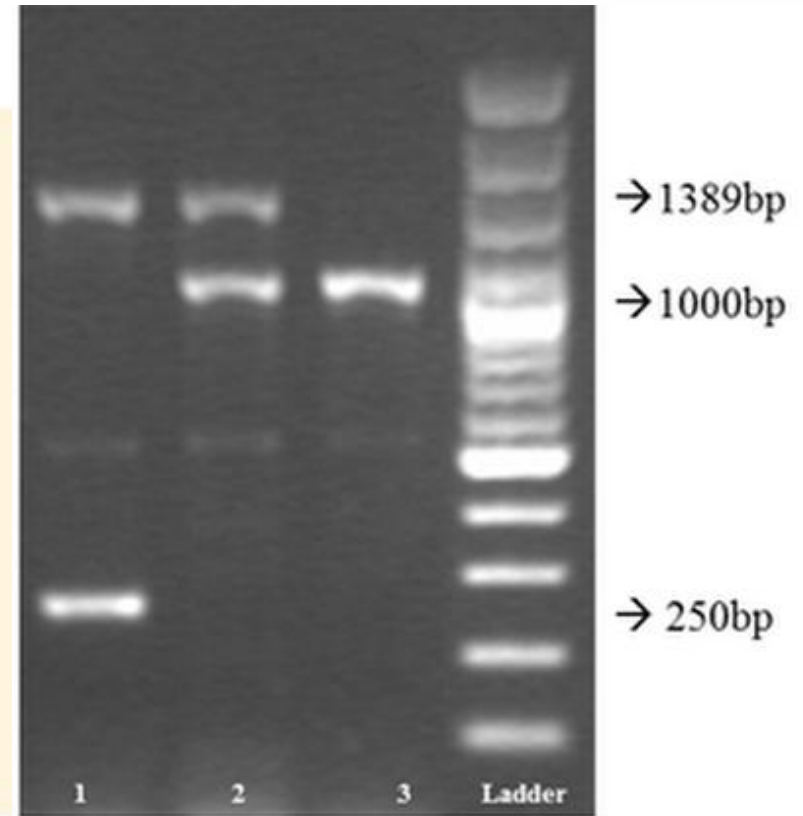
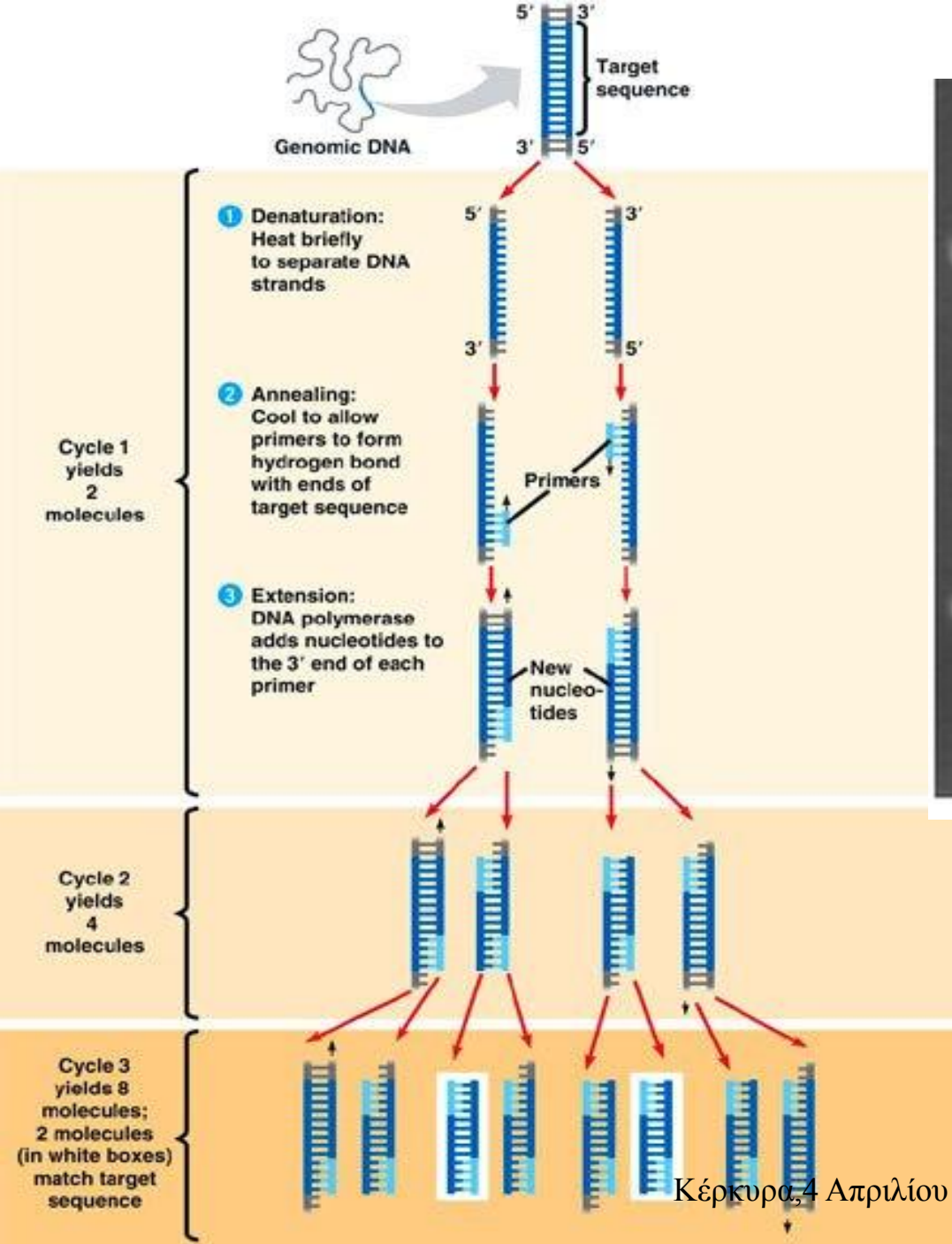
August 1, 2013

Since 2008, research scientists at FDA's Center for Food Safety and Applied Nutrition (CFSAN) have used whole genome sequencing (WGS) to investigate food contamination and foodborne illness outbreaks.

Knowing the exact order of molecules in an organism's genome allows FDA researchers to quickly and accurately identify specific strains of pathogens (such as Salmonella, E. coli and Listeria) in foods that make people ill.

Once the pathogen responsible for the illness is identified, researchers can trace it back to where the original contamination occurred. These trace back investigations help improve the safety of our food supply. Genomic data also helps identify which food products need to be recalled, protecting consumers from harmful products.





• Polymerase Chain Reaction (PCR)

- γονίδιο παραγωγής γλουκουρονιδάσης
- γονίδιο αντοχής σε ένα αντιβιοτικό
- γονίδιο παραγωγής τοξινών των VTEC

Κανονισμός (ΕΕ) αριθ. 209/2013 της Επιτροπής, της 11ης Μαρτίου 2013 , για την τροποποίηση του κανονισμού (ΕΚ) αριθ. 2073/2005 όσον αφορά τα μικροβιολογικά κριτήρια για τα φύτρα και τους κανόνες δειγματοληψίας για τα σφάγια πουλερικών και το νωπό κρέας πουλερικών Κείμενο που παρουσιάζει ενδιαφέρον για τον ΕΟΧ

Επίσημη Εφημερίδα αριθ. L 068 της 12/03/2013 σ. 0019 - 0023

L 68/22

EL

Επίσημη Εφημερίδα της Ευρωπαϊκής Ένωσης

ΠΑΡΑΡΤΗΜΑ

Το παράρτημα I του κανονισμού (ΕΚ) αριθ. 2073/2005 τροποποιείται ως εξής:

1. Το κεφάλαιο 1 τροποποιείται ως εξής:

α) η υποσημείωση 12 απαλείφεται·

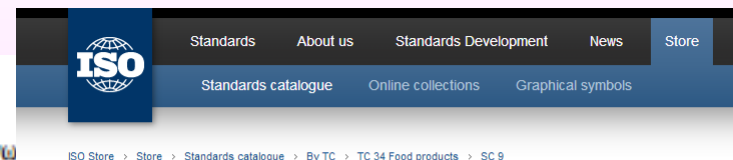
β) στη σειρά 1.18, η αναφορά στην υποσημείωση 12 αντικαθίσταται με την αναφορά στην υποσημείωση 23·

γ) προστίθενται η ακόλουθη σειρά 1.29 και οι αντίστοιχες υποσημειώσεις 22 και 23:

•1.29 Φύτρα ⁽²³⁾	Σγκατοξίνη που παράγεται από <i>E. coli</i> (STEC) O157, O26, O111, O103, O145 και O104:H4	5	0	Απουσία στα 25 γραμμάρια	CEN/ISO TS 13136 ⁽²²⁾	Προϊόντα που διατίθενται στην αγορά κατά τη διάρκεια διατήρησής τους
-----------------------------	--	---	---	--------------------------	----------------------------------	--

⁽²²⁾ Με βάση την τελευταία προσαρμογή από το εργαστήριο αναφοράς της Ευρωπαϊκής Ένωσης όσον αφορά το *Escherichia coli*, συμπεριλαμβανομένης της βεροτοξινογόνου *E. coli* (VTEC), για την ανίχνευση της STEC O104:H4.

⁽²³⁾ Εξαιρούνται τα φύτρα που έχουν υποβληθεί σε αποτελεσματική αγωγή για την εξάλειψη της σαλμονέλλας *spp* και της STEC.



ISO/TS 13136:2012

Microbiology of food and animal feed -- Real-time polymerase chain reaction (PCR)-based method for the detection of food-borne pathogens -- Horizontal method for the detection of Shiga toxin-producing *Escherichia coli* (STEC) and the determination of O157, O111, O26, O103 and O145 serogroups

Κέρκυρα, 4 Απριλίου 2014

+ ύδατα άρδευσης: απουσία στα 200ml

Table 3
Detection and typing methods for foodborne viral infections

Virus	Detection in:					
	Clinical samples		Food		Water	
	Methods	Category ^a	Methods	Category	Methods	Category
Calicivirus						
NoV	Stool, genome detection, EM ^b	S-R	Genome detection	S-E	Genome detection	S-R
SaV	Stool, genome detection, EM	S-R	Genome detection	S-E	Genome detection	S-E
Hepatitis A virus	serum, antibody detection	R	Genome detection, culture	S-E/R	Genome detection, culture	S-E/R
Rotaviruses						
Group A	Stool antigen detection	R	Culture, genome detection	S-E	Culture, genome detection	S-E
Non-group A	Stool antigen detection, EM	S-E/R				
Adenoviruses	Stool, antigen detection	R	Genome detection	S-E	Genome detection	S-E
Astroviruses	Stool, antigen detection	S-R	Genome detection, culture	S-E	Culture, genome detection	S-E
Enteroviruses	Stool culture	R	Culture	S-E	Culture, genome detection	S-R
Hepatitis E virus	Serum, antibody detection	R	Genome detection	NA	Genome detection	S-E

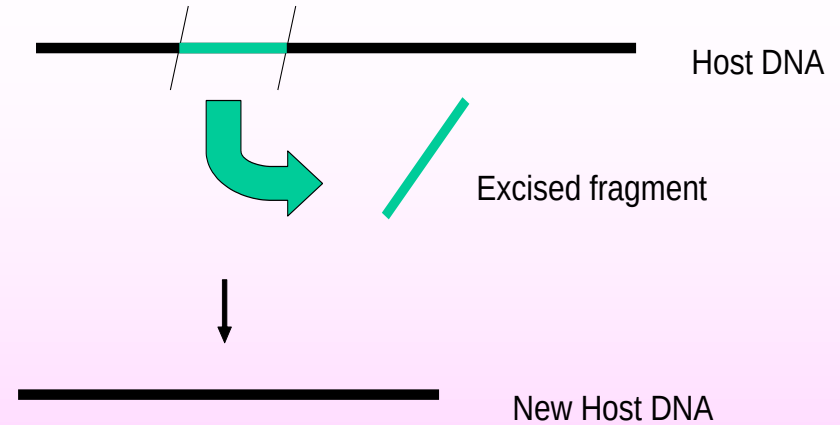
^a Category of laboratory: R=routine; S-R is routinely available in specialised laboratories; S-E=experimentally available in specialised laboratories; S-E/R=routinely available in some of the specialised laboratories, experimentally available in more.

^b EM=particle detection by electron microscope.

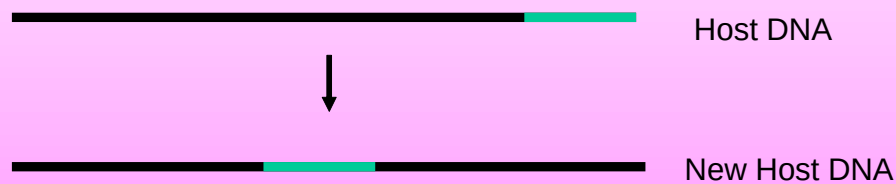
Insertion event



Deletion event



Rearrangement event



Ποικιλομορφία
στελεχών

Μοριακές τεχνικές τυποποίησης

- Pulsed Field Gel Electrophoresis (PFGE)
- Multiple-Locus Variable number tandem repeat Analysis (MLVA)
- Multi Locus Sequence Typing (MLST)

Κέρκυρα, 4 Απριλίου 2014

ΓΙΑΤΙ ΤΥΠΟΠΟΙΟΥΜΕ;

1. **Επιτήρηση τροφιμογενών νοσημάτων**
2. **Διερεύνηση επιδημιών**



1. Επιδημιολογική επιτήρηση τροφιμογενών νοσημάτων (surveillance)

συστηματική και εξελισσόμενη διαδικασία

συλλογής δεδομένων,

αναλύσεων αποτελεσμάτων ,

ερμηνείας αποτελεσμάτων

διασποράς αποτελεσμάτων

καταγραφή τάσεων
νοσημάτων

σχεδιασμός καταστολής

λήψη μέτρων

Ανάλυση σε υπολογιστικά / ηλεκτρονικές βάσεις δεδομένων → σύγκριση και συσχέτιση των “αποτυπωμάτων” σε τοπικό έως και παγκόσμιο επίπεδο, π.χ. Pulsenet

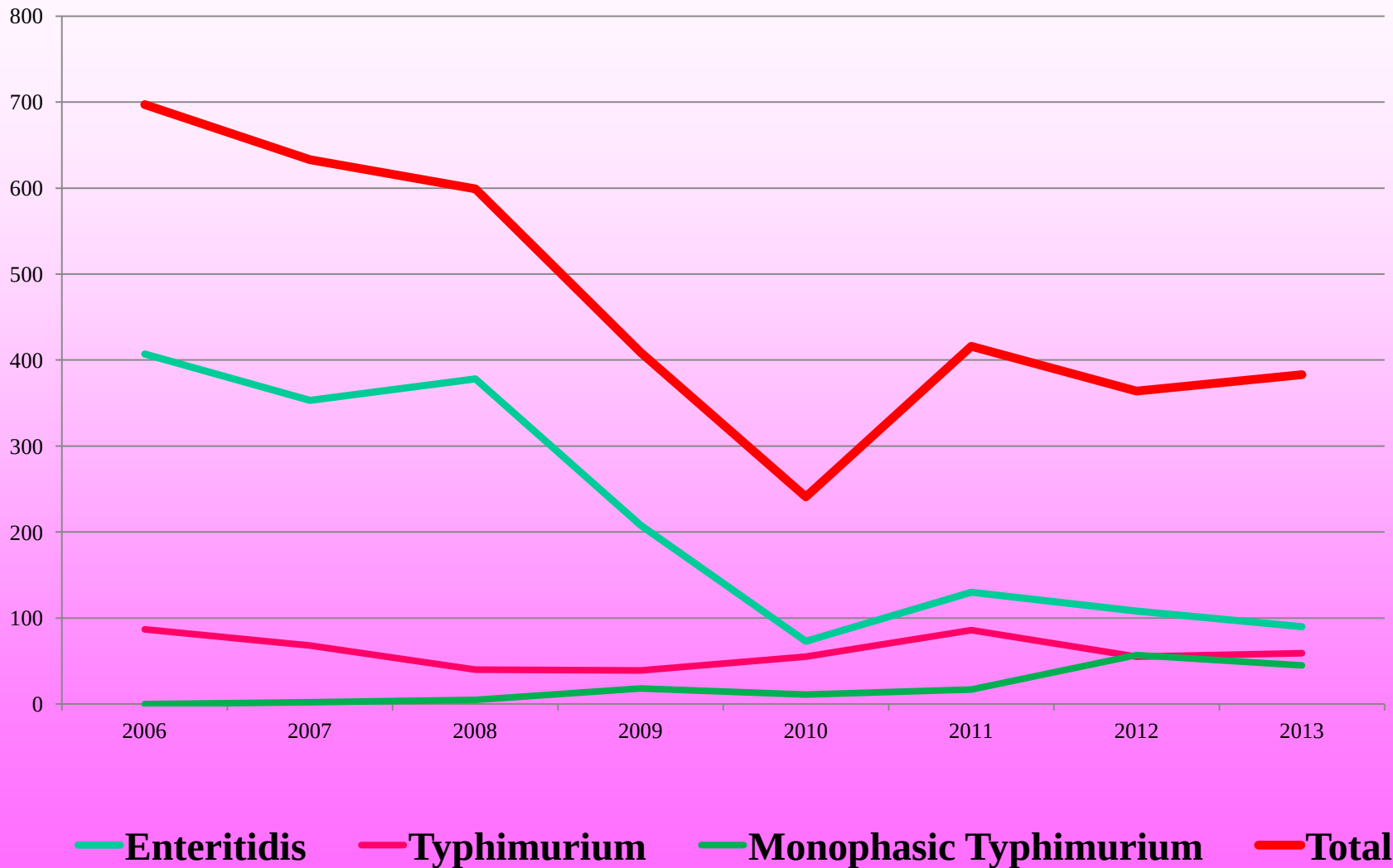
Top 20 Salmonella Serotypes in the EU/EEA, Q1 of 2012 and 2013

The 20 most frequently reported Salmonella serotypes (confirmed cases) in the EU/EEA, Q1 of 2012 and 2013 and percent change

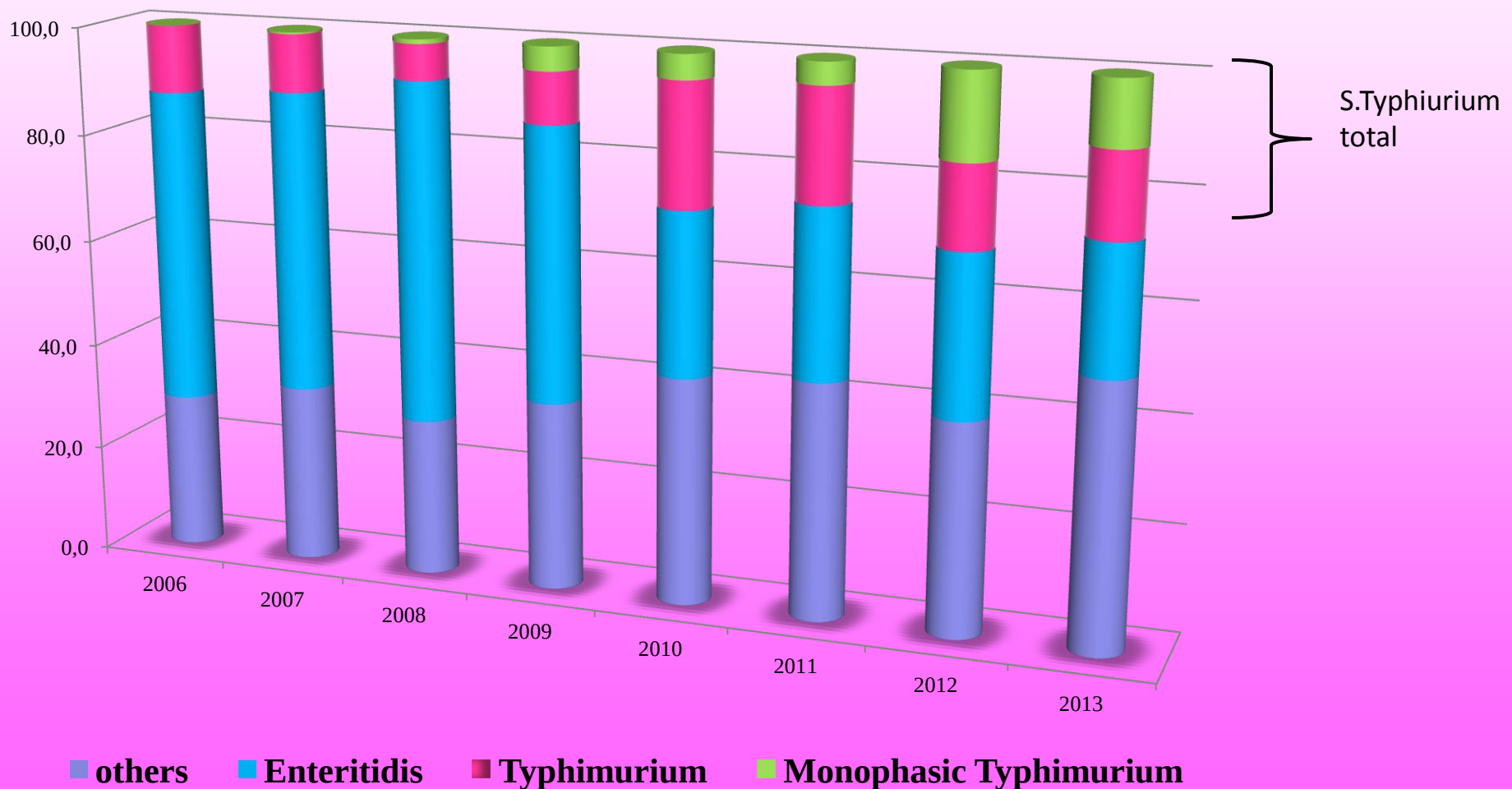
Serotype	Q1 2012		Q1 2013		% Change
	Freq	Percent	Freq	Percent	
Enteritidis	1957	23.8%	1746	22.9%	-10.8%
Typhimurium	1985	24.1%	1584	20.8%	-20.2%
Monophasic Salmonella Typhimurium 1,4, [5],12:i:-	1153	14.0%	1080	14.2%	-6.3%
Infantis	211	2.6%	213	2.8%	0.9%
Stanley	180	2.2%	150	2.0%	-16.7%
Derby	140	1.7%	105	1.4%	-25.0%
Newport	143	1.7%	105	1.4%	-26.6%
Panama	72	0.9%	95	1.2%	31.9%
Typhi	110	1.3%	87	1.1%	-20.9%
Agona	64	0.8%	85	1.1%	32.8%
Bovismorbificans	55	0.7%	80	1.1%	45.5%
Virchow	104	1.3%	78	1.0%	-25.0%
Rissen	69	0.8%	76	1.0%	10.1%
Kentucky	69	0.8%	75	1.0%	8.7%
Muenchen	54	0.7%	67	0.9%	24.1%
Corvallis	66	0.8%	60	0.8%	-9.1%

TESSy

Salmonella spp., Ελλάδα – ΕΚΑΣΣ 2006-2013



Salmonella spp., Ελλάδα-EΚΑΣΣ 2006-2012 (%)



COMMISSION REGULATION (EU) No 517/2011**of 25 May 2011****implementing Regulation (EC) No 2160/2003 of the European Parliament and of the Council as regards a Union target for the reduction of the prevalence of certain *Salmonella* serotypes in laying hens of *Gallus gallus* and amending Regulation (EC) No 2160/2003 and Commission Regulation (EU) No 200/2010**

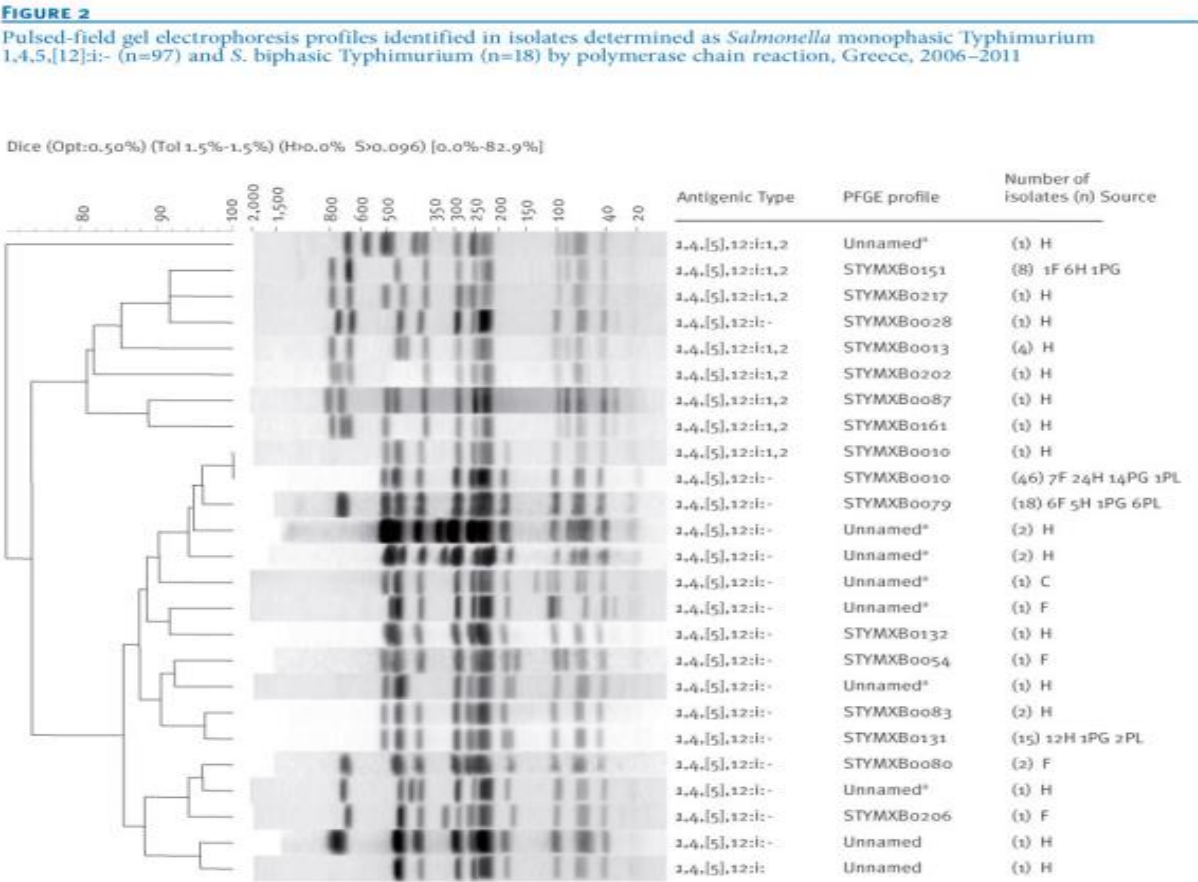
As regards monophasic *Salmonella* Typhimurium, serotypes with the antigenic formula 1,4,[5],12:i:- shall be included in the Union target.

Phenotypic and molecular characterisation of multiresistant monophasic *Salmonella* Typhimurium (1,4,[5],12:i:-) in Greece, 2006 to 2011

G Mandilara (gmandilara@esdy.edu.gr)¹, M Lambiri¹, M Polemis², M Passiotou³, A Vatopoulos¹
1. National Reference Centre for Salmonella, National School of Public Health & Central Public Health Laboratory, Hellenic Centre of Disease Control and Prevention, Vari, Greece
2. Hellenic Centre of Disease Control and Prevention, Athens, Greece
3. Veterinary Reference Centre for Salmonella, Chalkis, Greece

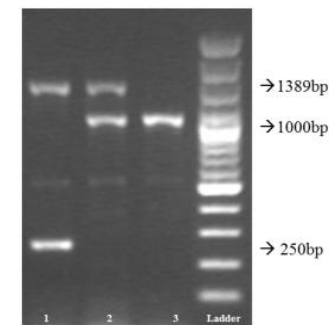
Citation style for this article:
Mandilara G, Lambiri M, Polemis M, Passiotou M, Vatopoulos A. Phenotypic and molecular characterisation of multiresistant monophasic *Salmonella* Typhimurium (1,4,[5],12:i:-) in Greece, 2006 to 2011. Euro Surveill. 2013;18(22):pii=20496. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20496>

Article submitted on 19 September 2012 / published on 30 May 2013



→ According to our results, the **main clone** of monophasic Typhimurium (1,4,5,[12]:i:-) circulating in humans in Greece is that of phage type DT120, R-type ASSuTSpTm and PFGE profile STYMXB.0010. This **clone** predominates among **pig** isolates as well, indicating that pigs may be a **reservoir** of this clone in Greece. **Clone** of DT193, R-type ASSuT and PFGE profile STYMXB.0131, is **predominant** within several **European** countries [10,40], but has a **low frequency** in **Greece**.

Figure 1. Differentiation of monophasic and biphasic *Salmonella* Typhimurium 1,4,5,[12]:i:- from other H:i serovars by polymerase chain reaction



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Lane 1: other biphasic 1,4,[5],12:i serovar, (phase 2 (*fliB*) flagellar gene-1,389 bp and *fliB*-*fliA* intergenic region-250 bp, because of the lack of IS200 fragment),

2. Διερεύνηση επιδημιών

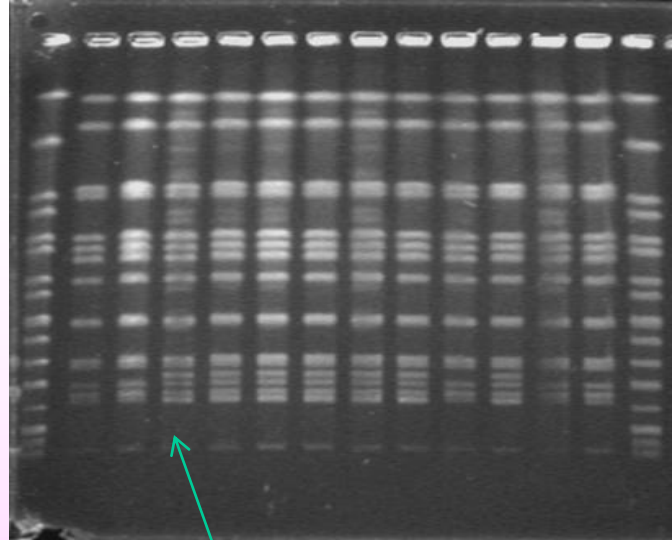
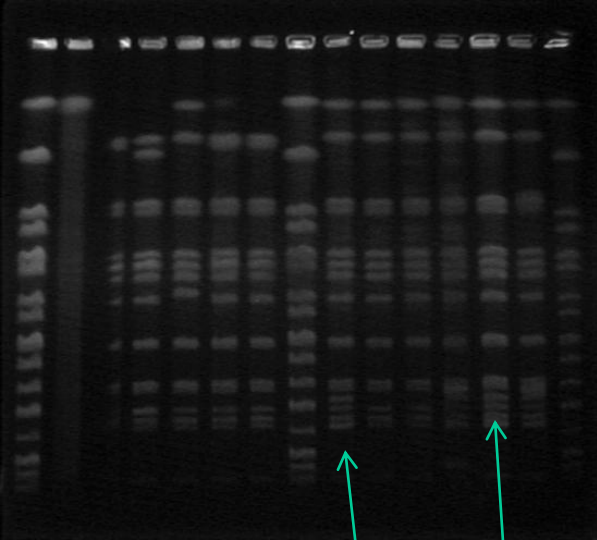
Τυποποίηση: αριθμό στελεχών

αρχική εστία

πορεία μετάδοσης

αποτελεσματικότητα μέτρων ελέγχου





**Επιδημία
Salmonella
enterica ser.
6,7:k:- από
κοτόπουλο σε
ψησταριά**

-12-2011

XbaI, *Salmonella enterica* ser. 6,7:k:-

121→ S. Thompson 2010

165→ S. Thompson 2010

293→ S. Thompson 2010

116→ S. Thompson 2011

118→ S. Thompson 2011

142→ S. Thompson 2011

172→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον

2→ ευαίσθητο μονοφασικό -κόπρانا

231→ ευαίσθητο μονοφασικό -κόπρانا

4648→ σουβλάκι, αντοχή:amp,spe,kan,tob, str,sss

380→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον;

350→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον;

70/2011→**ευαίσθητο** (αν και δήλωσε ότι έφαγε στον) -κόπρانا

71/2011→ ευαίσθητο (αν και δήλωσε ότι έφαγε στον) -κόπρانا

73/2011→**αντοχή**:amp,spe,kan,tob, str,sss-αίμα του 70/2011/δήλωσε ότι έφαγε στον

90/2011→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον αλέκτωρ

→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον

101/2011→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον

105/2011→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον

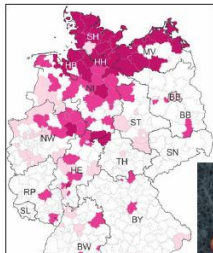
109/2011→ αντοχή:amp,spe,kan,tob, str,sss /δήλωσε ότι έφαγε στον

110/2011→ ευαίσθητο μονοφασικό -κόπρانا



Final presentation and evaluation of epidemiological findings in the

EHEC O104:H4 Outbreak Germany 2011



Σπόροι
fenugreek

Number of cases reported to the WHO as for 21 July 2011¹⁰

Country	Deaths	HUS cases	Non-HUS cases
Austria	0	1	4
Canada	0	0	1
Czech Republic	0	0	1
Denmark	0	10	15
France	0	7	10
Germany	48	857	3078
Greece	0	0	1
Luxembourg	0	1	1
Netherlands	0	4	7
Norway	0	0	1
Poland	0	2	1
Spain	0	1	1
Sweden	1	18	35
Switzerland	0	5	0
United Kingdom	0	3	4
United States	1	4	2
Total	50	908	3,167



Φύτρα fenugreek
Κέρκυρα, 4 Απριλίου 2014





26 May

EHEC O104:H4

Eigenschaften des Erregers sowie Hinweise und Hilfestellungen des RKI zur Diagnostik des gegenwärtig zirkulierenden Ausbruchstammes

(1. Veröffentlichung: 26.5.2011; Aktualisiert: 24.6.2011)

Eigenschaften des Erregers

Bei dem in dem gegenwärtigen Ausbruch (Mai/Juni 2011) zirkulierenden *E. coli* Stamm handelt es sich um einen pathogenen Vertreter von

- *E. coli* Serovar O104:H4.

Er vereinigt Merkmale Shigatoxin-bildender *E. coli* und enteroaggregativer *E. coli*:

EHEC Merkmale:

- Shigatoxin 1: - (negativ)
- Shigatoxin 2 (vtx2a) : + (positiv)
- Intimin (eae) : - (negativ)
- Enterohämolysin : - (negativ)

EaggEC Merkmale (EaggEC Virulenzplasmid):

- aatA-PCR: + (positiv) (ABC-transporter protein gene)
- aggR-PCR: + (positiv) (master regulator gene of virulence-plasmid genes)
- aap-PCR: + (positiv) (secreted protein dispersin gene)
- aggA-PCR: + (positiv) (AAF/II-fimbrial subunit-gene) #
- aggC-PCR: + (positiv) (AAF/II-fimbrial operon-gene) #
- astA-PCR - (negativ) (enteroaggr. *E. coli* heat-stable enterotoxin (EAST-1) gene) §

Unterschied zum O104:H4 Stamm HUSEC041 (www.ehec.org)/(RKI-01-09591), welcher Fimbrien des Typs AAF/III bildet (Prager R., Fruth A., and Tschäpe H., poster abstract XX, EHEC Workshop 2007).

§ Unterschied zum O104:H4 Stamm HUSEC041 (www.ehec.org)/(RKI-01-09591), welcher astA-PCR positiv ist.

Vergleichbare Stämme wurden bisher insgesamt selten und als solche primär beim Menschen nachgewiesen (s. Literatur am Ende des Beitrages).

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MLST Sequenztyp: ST678 (adk 6, fumC6, gyrB 5, icd 136, mdh 9, purA 7, recA 7). (**)

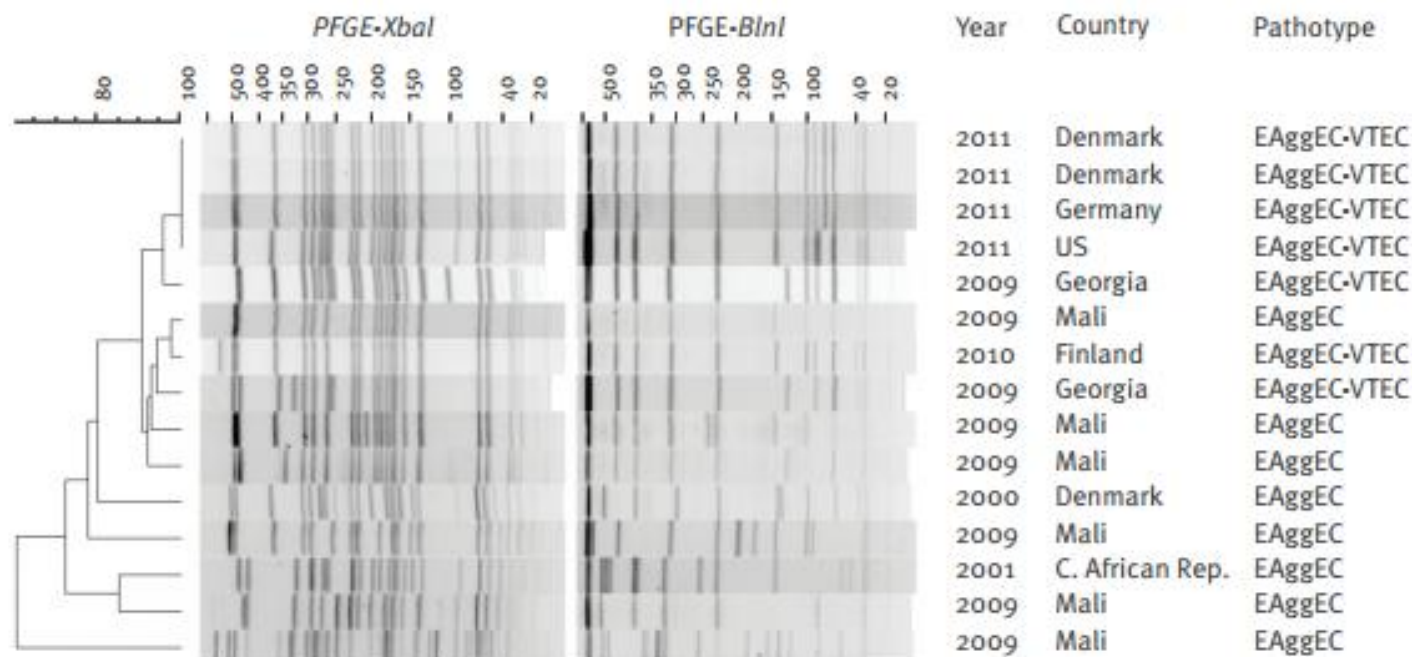
Der Stamm weist folgende Antibiotikaresistenzen auf. (Wir weisen ausdrücklich darauf hin, dass diese Angaben nur der Charakterisierung des Stammes dienen und **keine** Indikation zu einer antimikrobiellen Therapie nahelegen sollen !)

26 May

Ampicillin	R
Amoxicillin/Clavulansäure	R
Piperacillin/Sulbactam	R
Piperacillin/Tazobactam	R*
Cefuroxim	R
Cefuroxim-Axetil	R
Cefoxitin	R
Cefotaxim	R
Ceftazidim	R
Cefpodoxim	R
Imipenem	S
Meropenem	S
Amikacin	S
Gentamicin	S
Kanamycin	S
Tobramycin	S
Streptomycin	R
Nalidixinsäure	R
Ciprofloxacin	S
Norfloxacin	S
Tetracyclin	R
Nitrofurantoin	S
Trimethoprim/Sulfamethoxazol	R
Chloramphenicol	S
Fosfomycin	S

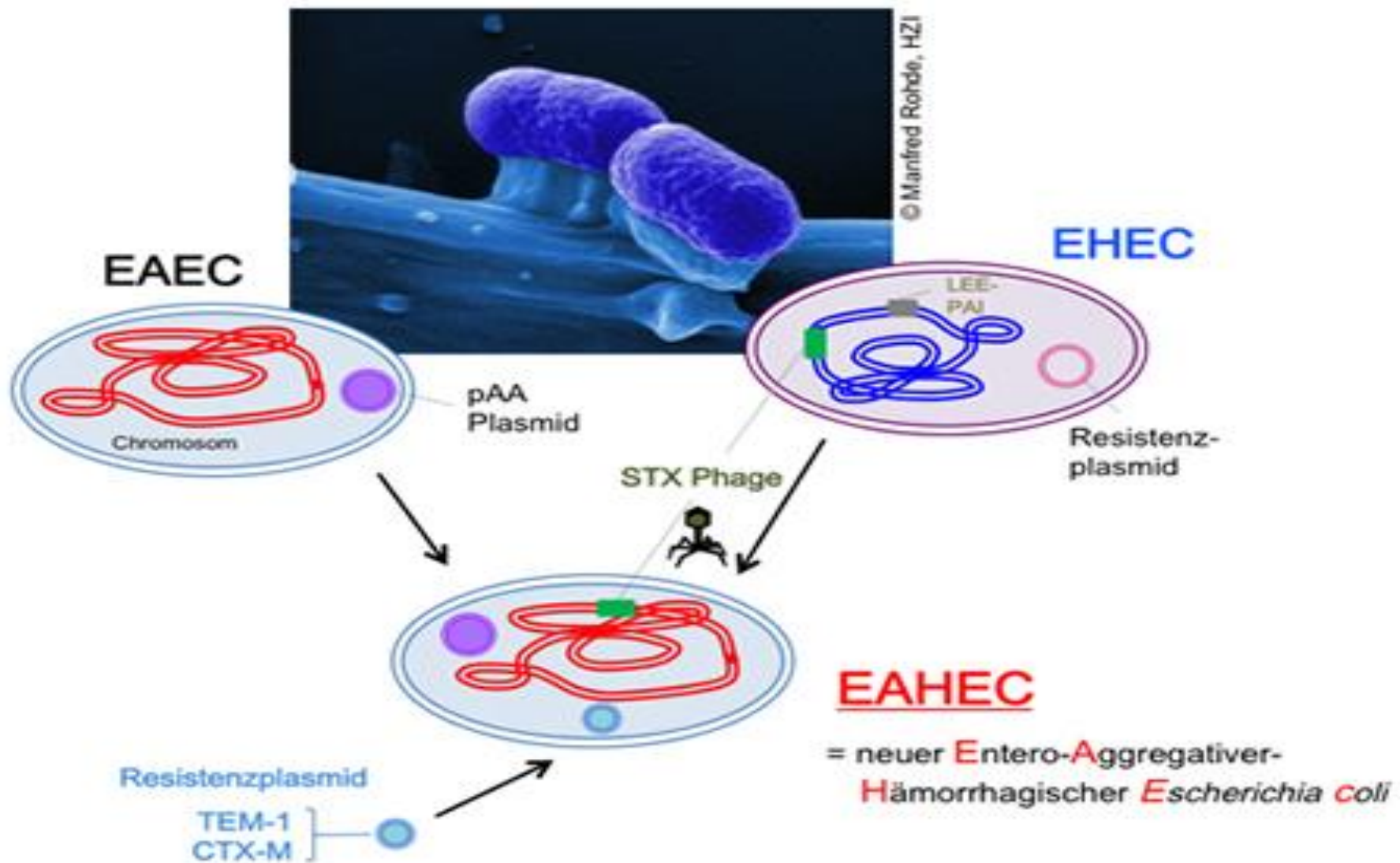
FIGURE

PFGE profiles (*Xba*I and *Bln*I) of *Escherichia coli* O104 compared with four isolates from the outbreak of haemolytic uraemic syndrome in Germany, May to June 2011



C. African Rep: Central African Republic; CDC: Centers for Disease Control and Prevention; PFGE: pulsed-field gel electrophoresis; RKI: Robert Koch Institute; US: United States.

PFGE profiles (*Xba*I and *Bln*I) using the *E. coli* non-O157 PulseNet protocol (www.pulsenetinternational.com). Dendrogram based on analysis of the *Xba*I profiles. All isolates are EAggEC O104:H4 with and without *stx2/vtx2* gene. German outbreak isolates are from patients infected in May 2011 in Germany and diagnosed in Denmark, the US (profiles provided by PulseNet, US CDC) and Germany (strain provided by RKI, Germany). O104:H4 isolates from Mali are from children with and without diarrhoea.

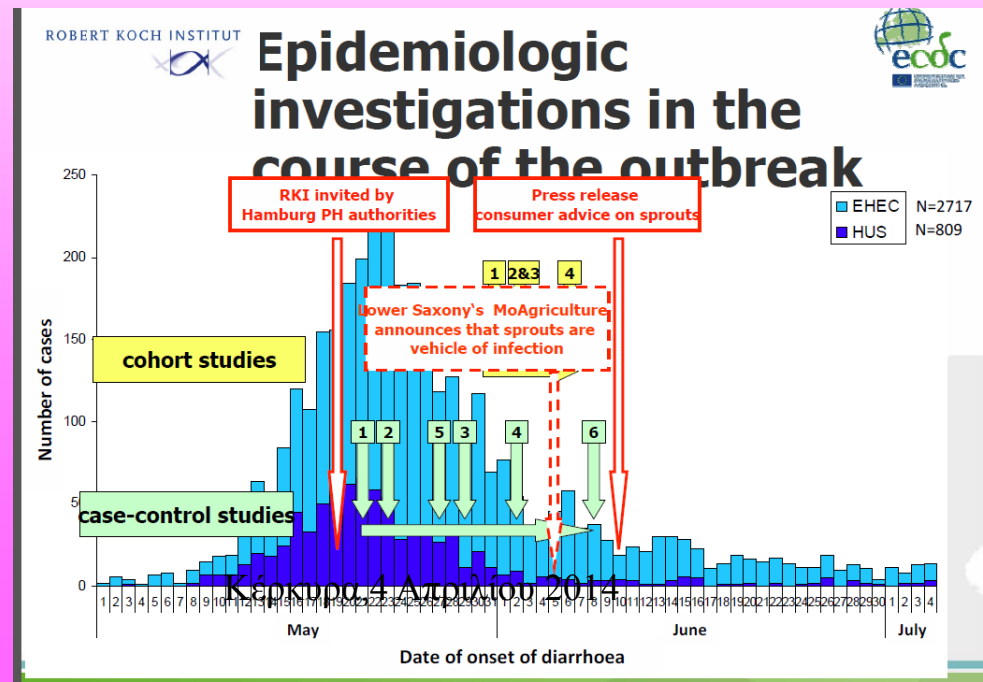


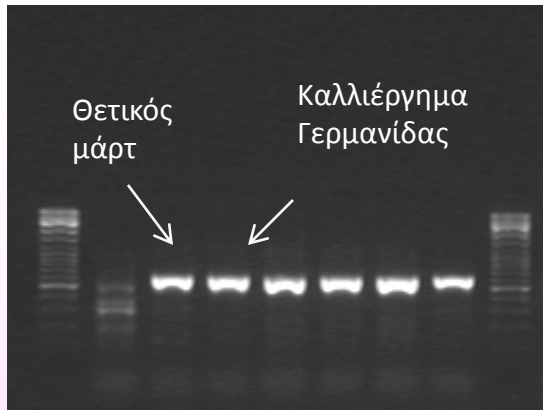
The sequence data indicate that the patient's isolates probably did not arise from an EHEC pathogen, but rather from a germ called EAEC (entero-aggregative *Escherichia coli*). This germ is able to attach particularly strongly to the epithelium. It then forms cell aggregates and initiates its normal, pathological programme. More than **96** percent of the genetic material of the Hamburg isolates are identical to that of an EAEC strain. The pathological potential of the EAEC germ has increased significantly by acquiring a special gene from other *E. coli* strains, such as EHEC, by means of bacterial viruses (phages) and integrating it into its own chromosome. This gene produces the so-called Shiga toxin, which originates from the pathogen causing shigellosis. It is a toxin which may trigger the haemolytic uraemic syndrome (HUS), namely blood decomposition, as well as complications, such as acute kidney failure. **This combination makes the bacterium dangerous: Its cells probably form large plaques in the intestine by attaching and aggregating, and this cell mass then produces a highly active poison. In addition, a so-called resistance plasmid protects the germ from a wide spectrum of antibiotics.**

Δεν απομονώθηκε το μικρόβιο από τρόφιμο

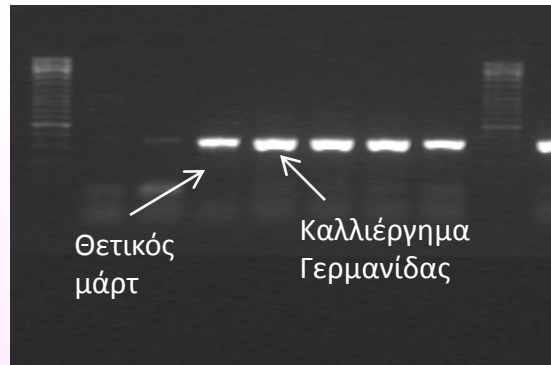
→ χαμηλό μικροβιακό φορτίο στους σπόρους (πολλαπλασιάστηκε κατά τη φύτρωση)

📌 **Επιδημίες** → strong evidence (ισχυρή ένδειξη) ≠ weak evidence (αδύναμη ένδειξη)





Vtx2 (626bp)



Vtx2α (350bp)

Απομόνωση *E.coli*
από Γερμανίδα
τουρίστρια στους
Παξούς

- Ίδιο φαινότυπο αντοχής με επιδημικό στέλεχος
- Ίδιο προφίλ PFGE
- Ενημέρωση ECDC

On September 28th, the **Dutch Food and Consumer Product Safety Authority** announced the recall of smoked salmon manufactured by **Foppen Paling en Zalm** and sold through major supermarket chains, including Aldi and Albert Heijn.

On October 1st, the Netherlands issued an alert through the EU Rapid Alert System for Food and Feed, notifying member countries that a **sample of smoked salmon originating from Greece** was contaminated with *Salmonella Thompson*. **Associated Press** reports that the contaminated smoked salmon was processed at Foppen's factory in Greece.

Foppen has initiated a recall of the following products, sorted by retailer:

Albert Heijn

- **AH smoked salmon cubes.** EAN: 8710400130574
- **AH smoked salmon.** EAN: 8710400383932
- **AH smoked salmon.** EAN: 8718265066915
- **AH salmon sandwich slices.** EAN: 8710400383956
- **AH hot smoked salmon.** All
- **AH salmon salad.** EAN: 8718265473072
- **Euro Shopper smoked salmon.** EAN: 8712224125903
- **AH Excellent Scottish salmon fillet.** EAN: 8710400383970
- **AH Excellent salmon season.** EAN: 8718265473164
- **AH Excellent smoked salmon fillet.** All
- **AH pure & honest Sockeye salmon.** EAN: 8710400628101

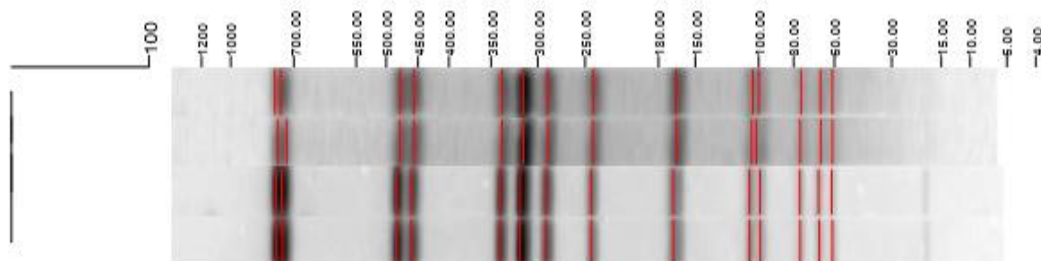
Aldi

- **Smoked salmon fillet.** 200 grams; EAN: with number 23066250 GB-6115EG; Foppen Eel and Salmon on back of package

Hema

Επιδημία
Salmonella
Thompson στην
Ολλανδία, από
σολωμό που
επεξεργάζεται σε
εργοστάσιο στην
Ελλάδα

PFGE_Monoph PFGE_Monophasic



336/12	HU	10/12	6,7:k:1,5	Preveza
336/12	HU	10/12	6,7:k:1,5	Preveza
Outbreak Netherlands			6,7:k:1,5	
Outbreak Netherlands			6,7:k:1,5	

From: Γεωργία Μανδηλαρά <georgia.mandilara@esdy.edu.gr>
 To: <Max.Heck@rivm.nl>, <Wilfrid.van.Pelt@rivm.nl>,
 Cc: "Mellou Kassiani" <mellou@keelpno.gr>, "Alkis Vatopoulos" <avatopoulos@esdy.edu.gr>, <georgiamandilara@gmail.com>
 Date: 11/01/2012 11:03 AM
 Subject: FW: S.Thompson

Dear Wilfrid and Max,

I send you attached the dendrogram (GelCompar) correlating S. Thompson strains.
 We included the PFGE pattern of the outbreak strains in the Netherlands (EPIS) using the molecular weights of the S. Braenderup bands and aligned them with ours.

It seems that the S. Thompson strain isolated from the employee in the factory in Preveza and the outbreak strains in the Netherlands are indistinguishable by PFGE.

We are at your disposal for any further information.

Κέρκυρα, 4 Απριλίου 2014

Please confirm the receipt of this e-mail.

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☐	UI ID	Title	Created	Country or institution	Pathogens	Number of posts	Modified
	UI-192	Hepatitis A cases with travel history to northern Italy	08/05/2013 03:36 PM	Germany	hepatitis A virus	18	04/03/2014 05:51 PM
	UI-240	Salmonella Cotham: Request for Information	26/02/2014 09:23 PM	United States	Salmonella spp.	12	04/03/2014 03:44 PM
	UI-237	EHEC O157 in Finland	11/02/2014 08:38 AM	Finland	verotoxigenic Escherichia coli	11	28/02/2014 06:36 PM
	UI-241	Increase in a rare type of Listeria monocytogenes in the United Kingdom	28/02/2014 11:33 AM	United Kingdom	Listeria monocytogenes	1	28/02/2014 11:33 AM
	UI-236	Report from Ireland of ciprofloxacin resistant Shigella sonnei	10/02/2014 04:38 PM	Ireland	Shigella sonnei	8	20/02/2014 10:48 AM
	UI-238	Increase in cases with Yersinia enterocolitica O:9 in Norway	12/02/2014 05:26 PM	Norway	Yersinia enterocolitica	6	17/02/2014 03:58 PM
	UI-239	Increase in Denmark of S. Enteritidis with a rare MLVA type	13/02/2014 01:31 PM	Denmark	Salmonella enteritidis	6	14/02/2014 02:05 PM

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Urgent inquiry: Increase in a rare type of Listeria monocytogenes in the United Kingdom

Epidemiological and microbiological information

UI ID: UI-241

Country or institution: United Kingdom

Disease: listeriosis

Pathogens: Listeria monocytogenes

Open map

ECDC Summary

28 February 2014

An increase in a rare type of Listeria monocytogenes has been reported in the **United Kingdom**. This type, L. monocytogenes serotype 1/2a faFLP VIIa.104, was first isolated in February 2012. Since then, 6 further cases have been reported around the country between August 2013 and February 2014.

The age-sex distribution of this type is atypical to previous clusters the UK has investigated. All cases are females between ages 3 years and 73 years and three cases are pregnancy associated. Four cases have underlying conditions and one of the pregnancy associated case resulted in the life birth of a male infant. Two deaths and two still births have been reported so far. The most common exposures reported are consumption of hospital meals and consumption of sandwiches. Epidemiological investigations are yet to identify a common link between the cases. Further microbiological, epidemiological and environmental investigations are on-going. The UK is working with the Pasteur Institute for the isolates to be typed by PFGE.

Initial urgent inquiry and responses

Epidemiological and microbiological information

Suspected sources and additional information

Authoring information

☐ Country or institution

Modified

Number of cases

Epidemiological information

Microbiological information

Κέρκυρα, 4 Απριλίου 2014

You are here: [EPIS](#) > [FWD](#) > [News](#) > [Salmonella Kitenge \(28:y:enx\)_Greece](#)

Salmonella Kitenge (28yenx)_Greece

Attachments

There are no attachments.

Post

Started: 21/03/2014 12:13 PM by [Georgia MANDILARA](#) from Greece

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[Salmonella Kitenge \(28:y:enx\)_Greece](#)

Salmonella Kitenge (28:y:enx)

We identified four (4) cases of S.Kitenge in Greece, dates of isolation: 1st: 25/2/2013 2nd: 13/08/2013, 3rd:22/8/2012, and 4th: 12/3/2014. The 1st case was 7 years old, but the three of the cases were at age group <5 months (2,3 and 5 months old). Since 1999, this serotype has not been reported in our country. All isolates were susceptible to all tested antimicrobials. PFGE profile results will be uploaded shortly. Epidemiological investigation is ongoing.

We would like to ask if any other Member State has reported S. Kitenge either in human or food samples recently.

Posted: 21/03/2014 12:36 PM by [Paul MCKEOWN](#) from Ireland

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Ireland has not ever identified human isolates of this serotype.

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Posted: 21/03/2014 01:26 PM by [Christina FRANK](#) from Germany

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No S. Kitzge in Germany (no notifications since 2001, no isolates in the NRC since 1994). Christina Frank

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Posted: 21/03/2014 01:29 PM by [Jevgenia EPSTEIN](#) from Estonia

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No human cases notified or non-human strains found in Estonia

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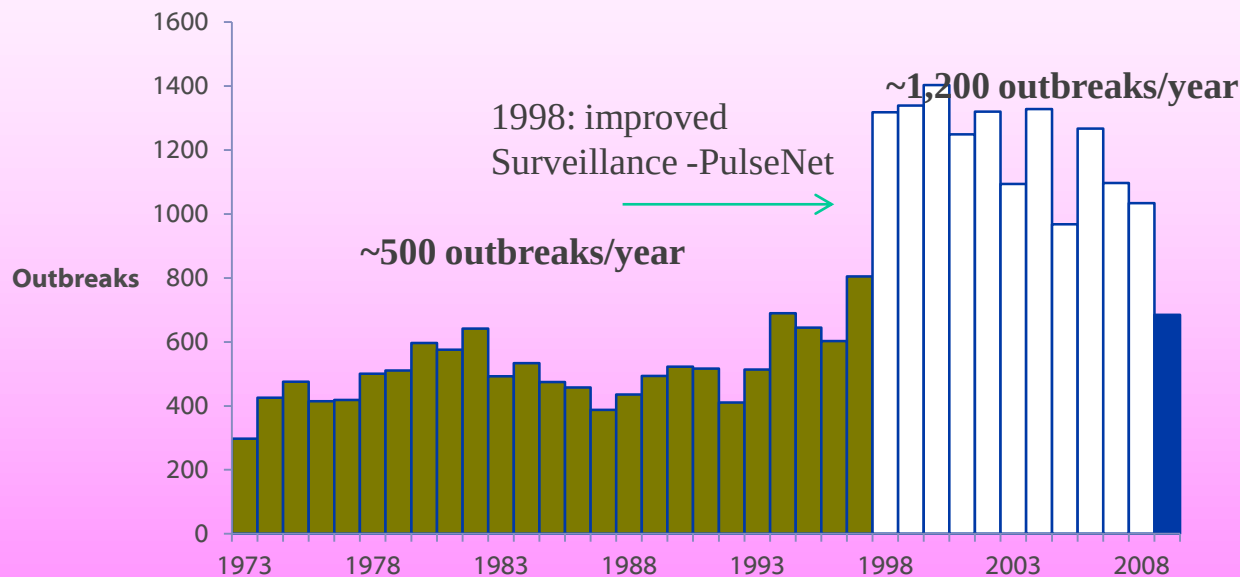
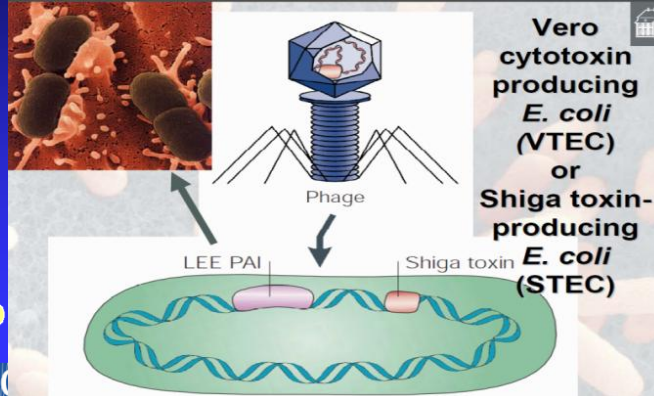
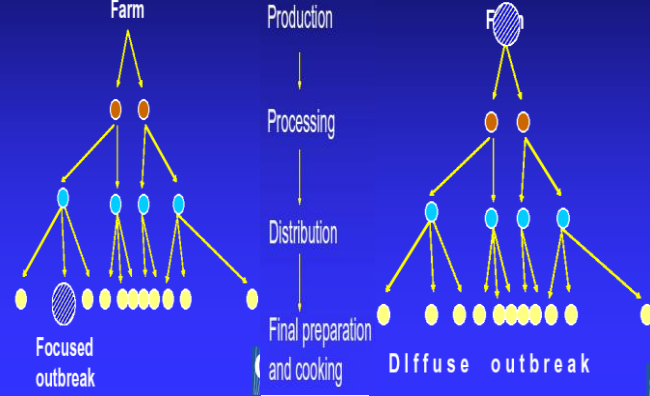
Posted: 21/03/2014 03:49 PM by [Max HECK](#) from Netherlands

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We have looked back until 2005 and never seen this serovar in The Netherlands

M.Heck

RIVM

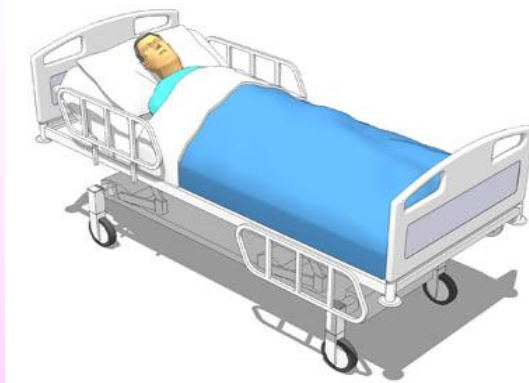
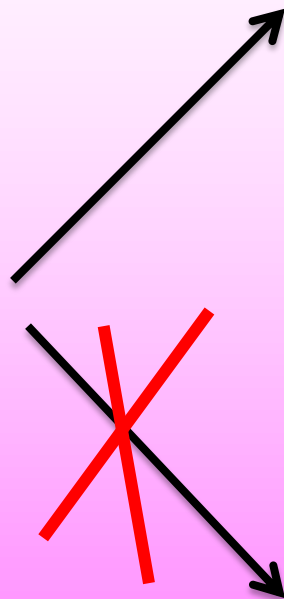


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-Μοριακή τυποποίηση → «αποτύπωμα» σε μοριακό επίπεδο → απαραίτητο εργαλείο στην επιδημιολογική επιτήρηση και διερεύνηση επιδημιών

-Πάντα συνεκτίμηση με επιδημιολογικά δεδομένα

Κρούσμα τροφ. νοσήματος
Στόχος



20



30

Ευχαριστώ...



Μανδηλαρά Γεωργία
Καραδήμας Κλέων
Βουλγαράκη Ασημίνα

Κέρκυρα, 4 Απριλίου 2014