



MRSA in relation to Food Safety

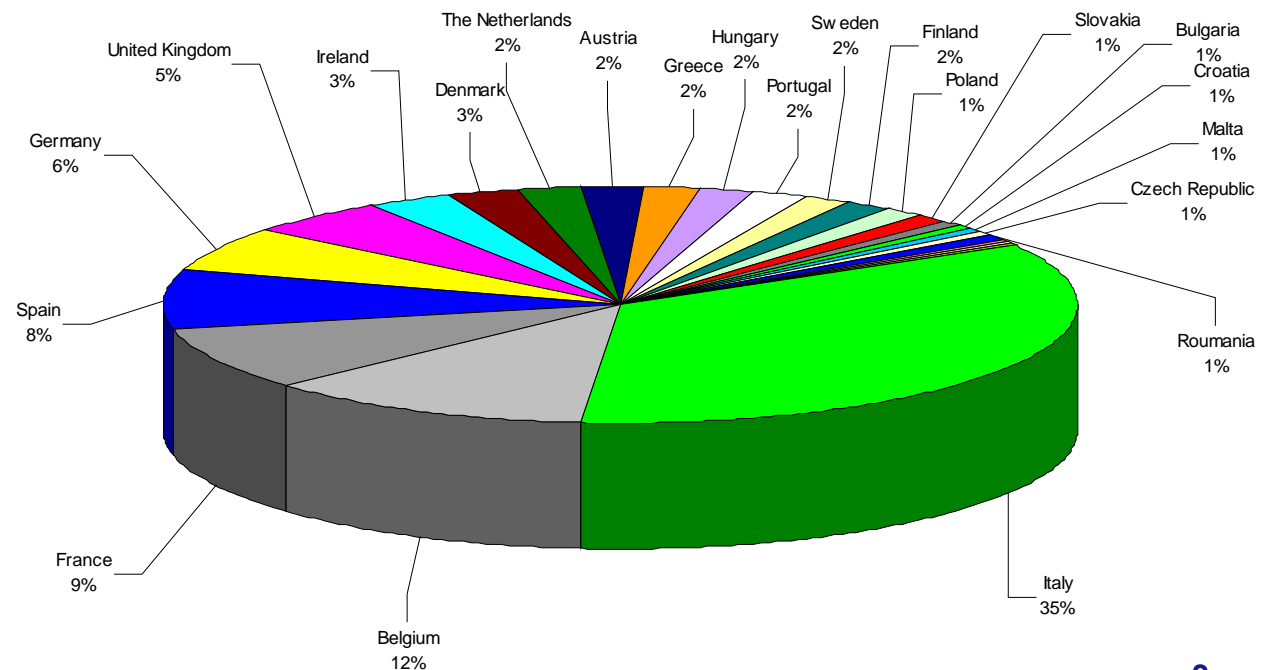
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Conference on MRSA – FVE – Brussels – 8 April 2008

- 1) Providing scientific opinions
- 2) Assessing risk of regulated substances
(food additives, pesticides, GMOs)
- 3) Monitoring risk factors and animal diseases
(BSE, zoonoses, food-borne hazards)
- 4) Investing in food science
(EFSA's scientific colloquia)
- 5) Nutrition (health claims)

EFSA today

- Based in Parma, Italy
- Over 190 scientific experts
- Nearly 550 scientific opinions
- 320 staff

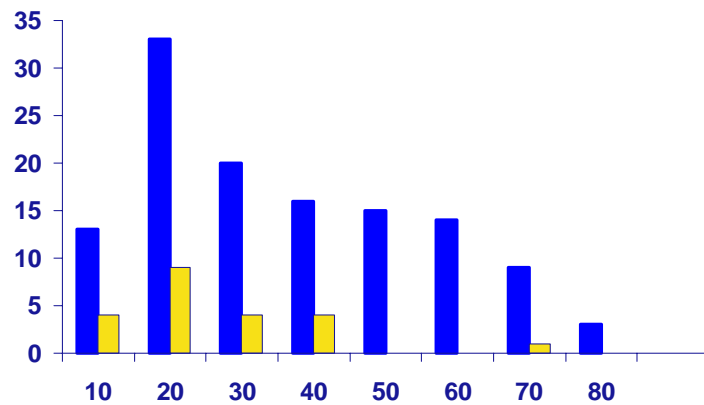


9 Scientific Panels – soon 10

- Food additives, flavourings, processing aids, materials in contact with food (AFC) **Will now Split**
- Animal health and welfare (AHAW)
- Biological hazards (BIOHAZ): **identify in terms of qualitative risk, the extent to which food serves as a source for the acquisition, by humans, of antimicrobial resistant bacteria or bacteria-borne antimicrobial resistant genes**
- Contaminants in the food chain (CONTAM)
- Additives and products in animal feed (FEEDAP)
- Genetically modified organisms (GMO)
- Dietetic products, nutrition and allergies (NDA)
- Plant health (PLH)
- Plant protection products and their residues (PPR)

The old days...

Study from pre-antibiotic era (n=122) :
Letality of *S. aureus* Bacteraemia: **82%**



Skinner et Keefer. **1941**. Arch Int. Med; 68:851-75

< 10yr. ca. 90% of all *S. aureus* penicillin resistant

- HA-MRSA: Long known problem
- Indicator for hospital acquired infections
- Increase in (estimates)
 - morbidity (prolonged length of stay / pneumonia/sepsis, 3 million/yr HCAI in EU)
 - mortality (50.000 attributable deaths/yr in EU; 44.000-98.000 deaths annually in the US / 2000 data),
 - Costs (estimated healthcare cost for EU €6.75 billion not incl. productivity loss)

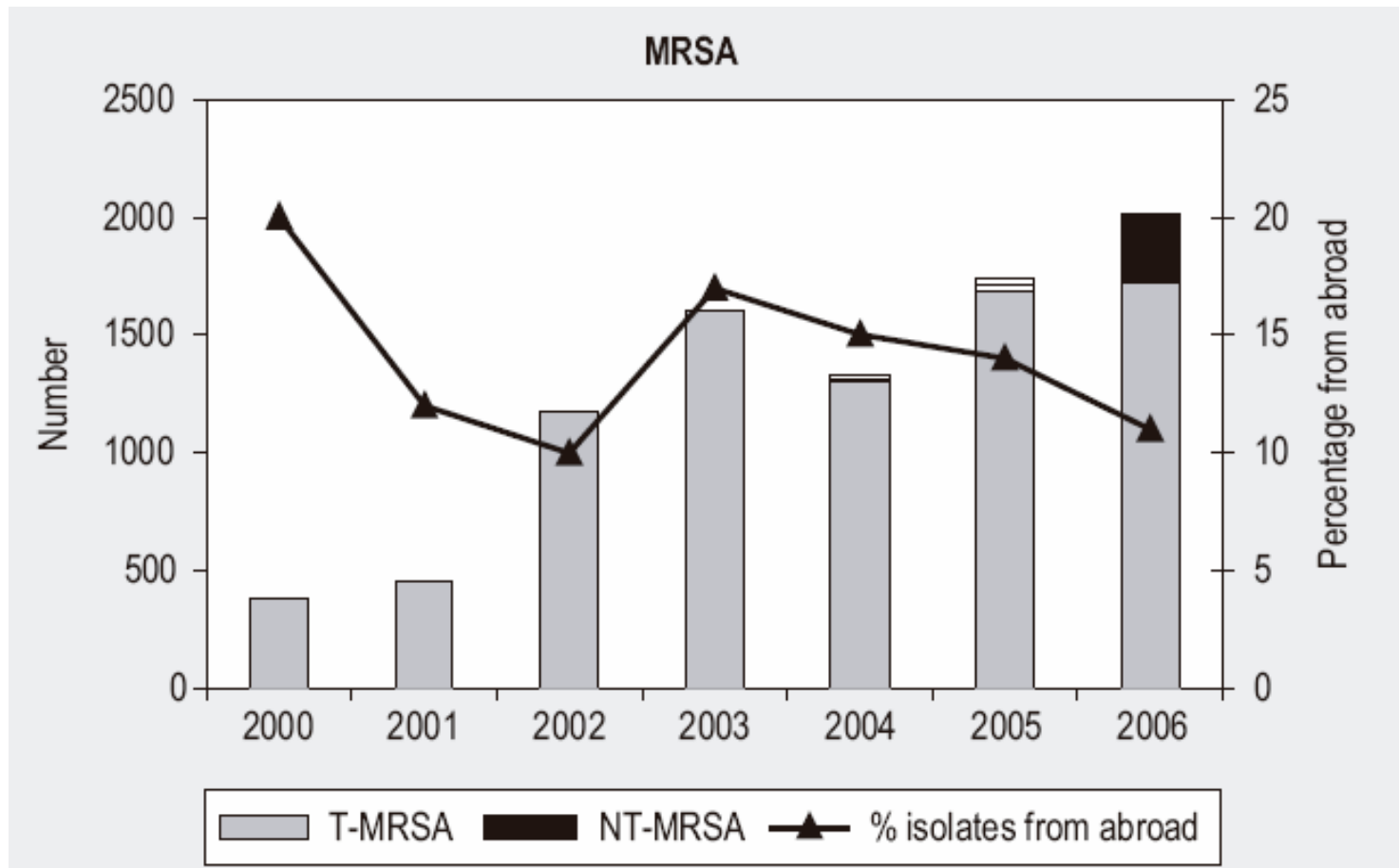
- CA-MRSA: more and more reports of Community acquired strains
- Panton-Valentine Leukocidin (PVL) producers in particular populations (MSM, inmates, drug users, sport)
- PVL-negatives: relation to food?, Farming / Pig holders

MRSA colonization

	Pigs	Open population	Vets / pig farmers
NL	39% (Vet Microbiol 2007; 122: 366-72)	0,03 % (J Hosp Infect 2004; 56: 321-5)	26% (EID 2005;11:1965-6) / 4,6% (EID2006;12:1939-41)
BE (Prevalence survey of MRSA in swine and pig farmers in BE compared to other human population)	26-71% (sows to fattening pigs)	1,6%	37,8%
Canada (Vet Microbiol 2008; 128: 298-303)	24,9%	2,7%	20%
272 participants conference on pig health			12%

Numbers and the origin of MRSA in NL

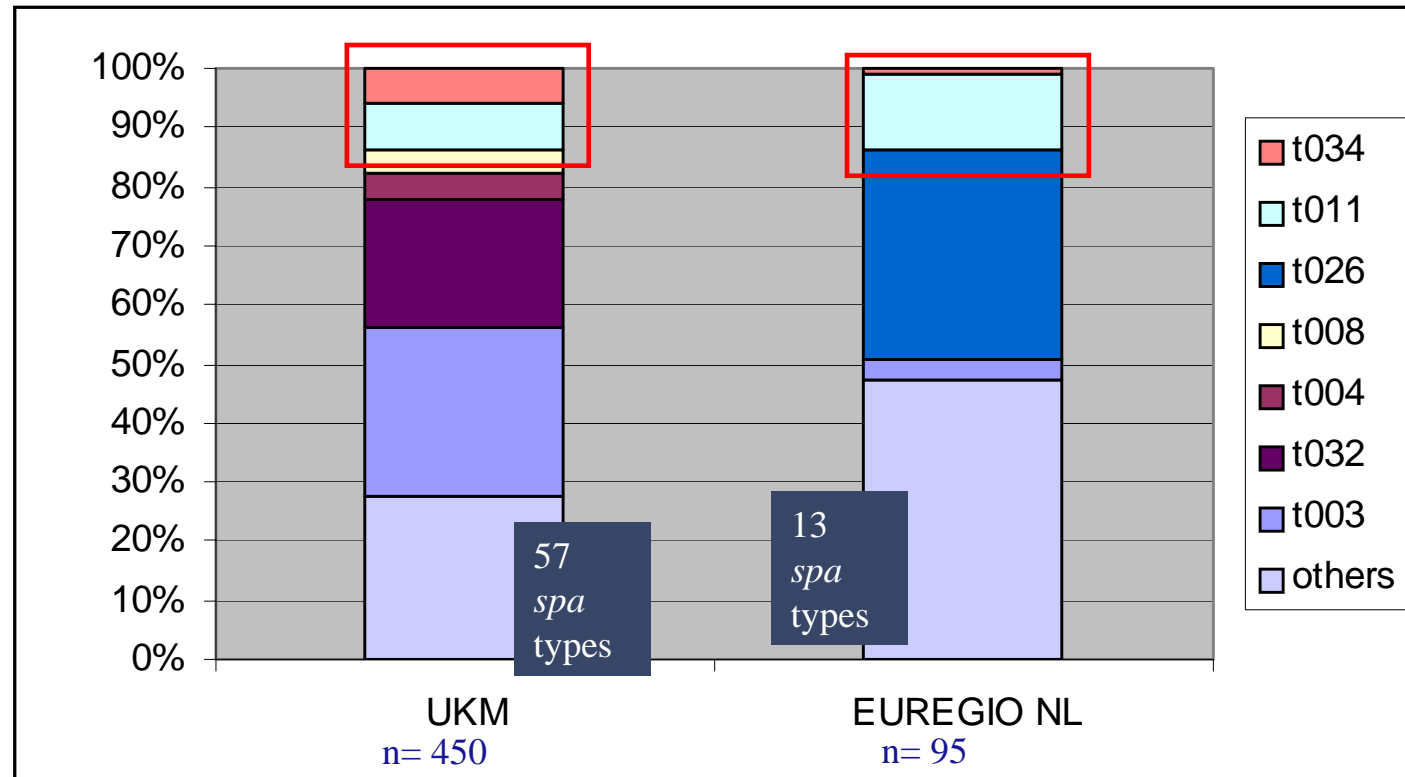
Source: www.rivm.nl - Zoonoses and Zoonotic Agents in Humans, Food, Animals and Feed in the Netherlands 2003-2006



2006: 14% NT that showed to be ST398

MRSA-Isolates in the EUREGIO

Courtesy of Alex Friedrich
EUREGIO / Seq-net



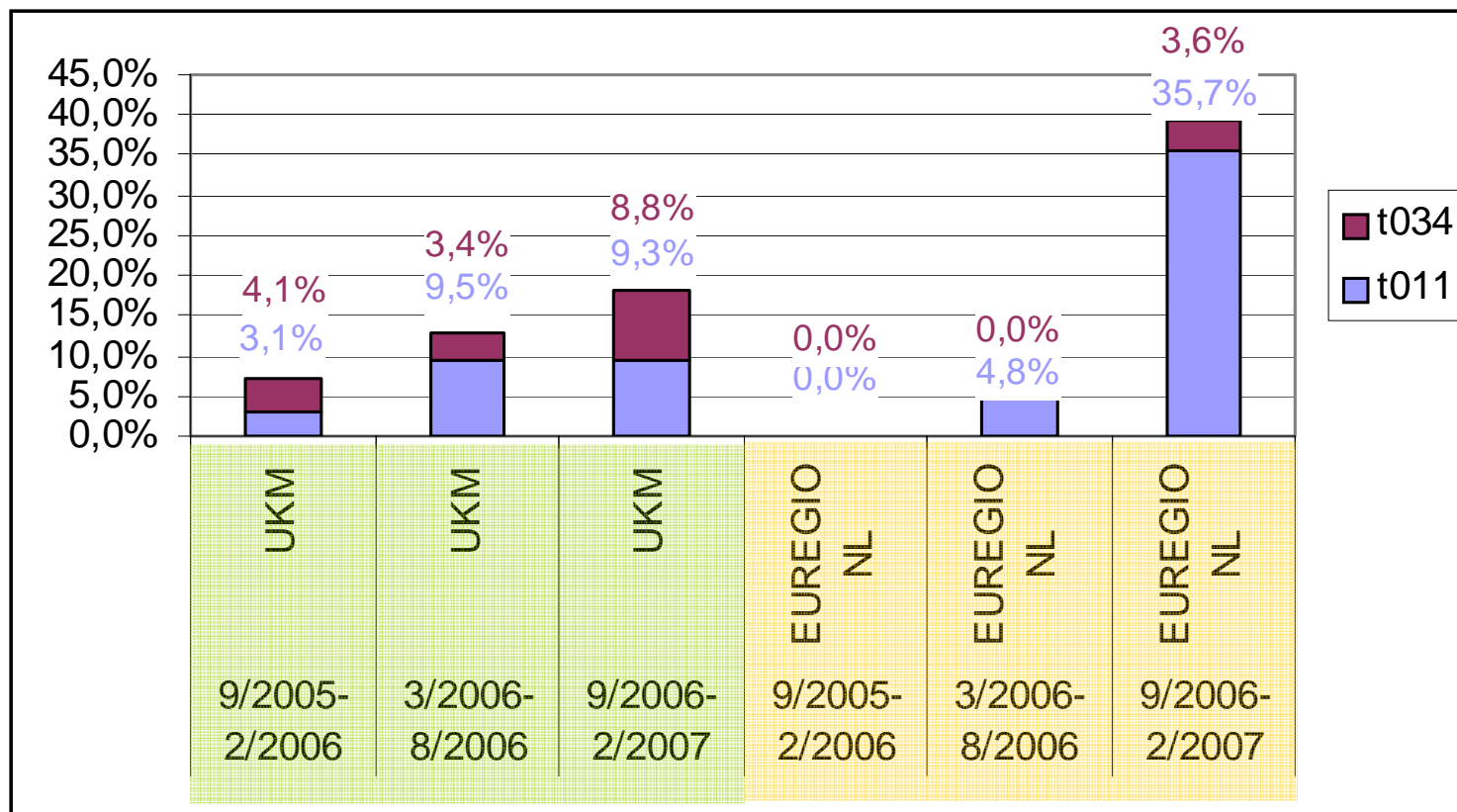
EUREGIO NL: Laboratorium Microbiologie Enschede

09/05-02/07

UKM: University Hospital Münster

Koeck et al. Emergence of MRSA spa type t011 in the Dutch-German border region EUREGIO Twente/Münsterland, DGHM 2007, Göttingen

t011 und t034 as emerging spa types in the EUREGIO



Resistance patterns of MRSA in pigs

agent	<i>spa</i> type				
	t011 (n=127)	t034 (n=9)	t108 (n=1)	t1451 (n=6)	t2510 (n=26)
Clindamycin	55(43.3)	9 (100)	1 (100)	0 (0)	23 (88.5)
Erythromycin	55(43.3)	9 (100)	1 (100)	0 (0)	23 (88.5)
Tetracyclin	127 (100)	9 (100)	1 (100)	6 (100)	26 (100)
Gentamycin	45 (35.4)	0 (0)	0 (0)	0 (0)	0 (0)
Ciprofloxacin	0 (0)	0 (0)	0(0)	0 (0)	0 (0)
Cotrimoxazole	0 (0)	0 (0)	0(0)	0 (0)	1 (3.8)
Chloramphenicol	0 (0)	0 (0)	1(100)	0 (0)	0 (0)

Also in all other studies: 100% tetra resistant referring to link with usage

Does t011 cause disease

	UKM	EUREGIO NL
Nasopharyngeal Screenings	36 (80%)	10 (83%)
Wounds	4 (9%)	1 (8.5%)
Respiratory fluids	2 (4%)	0 (0%)
Blood cultures	0 (0%)	0 (0%)
others	3 (7%)	1 (8.5%)
total	45	12

Does MRSA ST 398 cause disease?

- Several cases of infections in humans (including severe infections) have been documented in:
 - The Netherlands (Huijsdens et al., 2006),
 - Germany and Austria (Witte et al., 2007),
 - Denmark (Robert Skov, unpublished results)
 - Eurosurv. 2008;13(9): 1st outbreak of MRSA ST398 in NL hosp.
 - EID 2008:14;3:479 NL working party surv. & research of MRSA

- Kluytmans '95: first food-associated MRSA outbreak with several fatalities
- Jones '02: reported small outbreak
- Normanno '07: Italian study 2003-5. 3,75% MRSA in food isolates (4 in bovine milk, 2 in diary products)
- Van Loo '07: NL study 2,5% MRSA (in 37 *S.aureus* isolates from 79 samples)

MRSA in food – recent NL findings

Source: www.VWA.nl - *MRSA bacteria on meat, 8 March 08*

- MRSA present around 11% (of 1300 raw meat samples).
- 84% of MRSA non-typable (NT), type found in animals and farmers
- Nr. MRSA bacteria very low (mostly <10 colony-forming units/gr)
- Unlikely that NT-MRSA spreads in the population via foodstuffs:
 - Unlikely this would go unnoticed
 - Numbers so low that risk of colonisation is considered slight.
 - Geographical distribution of NT-MRSA among population correlates strongly with that of the animal species in which bacterium has been found. If food contributed substantially to the spread, NT-MRSA would be spread far more evenly across the Dutch population.
- Based on current data, it is unlikely that meat contributes significantly to the spread of MRSA bacteria among humans.
- Route would be rather through transmission than through ingestion

- Currently apparently no high risk from food
- Increasing rates of MRSA in animals important:
 - Seems new (since 2003), how will it develop further
 - Discover always new sequence types / risk of virulent strain
 - Demonstrated to cause disease in humans (animal data lacking)
 - Risk of introduction into hospitals
 - Low prevalence countries: costs of search & destroy
 - Possible concerns for media-attention and pig trade
- Need to understand magnitude

Baseline study breeding pigs

- How wide-spread is MRSA in food animals
- Which types occur in animals
- Which type of pig farms are affected
- EFSA proposed specifications to monitor the prevalence of MRSA in breeding pigs (also slaughter pigs)
- Collaboration with CRL in Copenhagen
- Baseline survey for *Salmonella* spp in breeding pig extended to MRSA (January to December 2008)

Merci !

Renewed website
<http://www.efsa.europa.eu>

Register of scientific opinions