CONVEGNO «ANTIBIOTICORESISTENZA: UN APPROCCIO GLOBALE PER UNA SFIDA MONDIALE»

Ozzano Emilia (BO)

Aula Messieri - 28 aprile 2017

In ricordo di Roberto Mattioli

Monitoraggio AMR nel cane e nel gatto

ALMA MATER STUDIORUM
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...UNA NAZIONE DI PETS

Dati EURISPES Rapporto Italia 2016:

43,33% degli italiani detiene almeno un pet

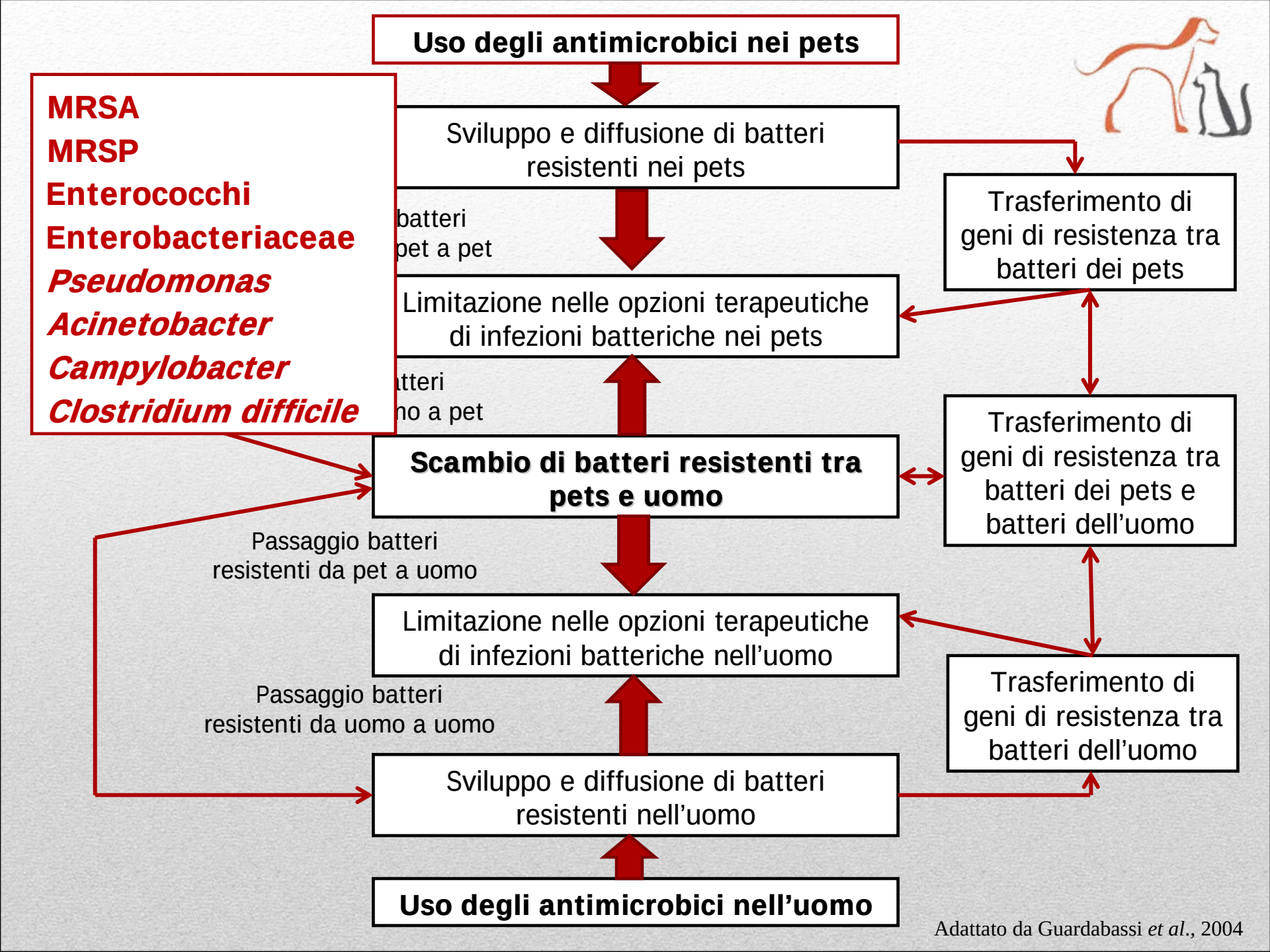
In Italia circa 60 milioni di animali da compagnia

- **7,5 milioni di gatti**

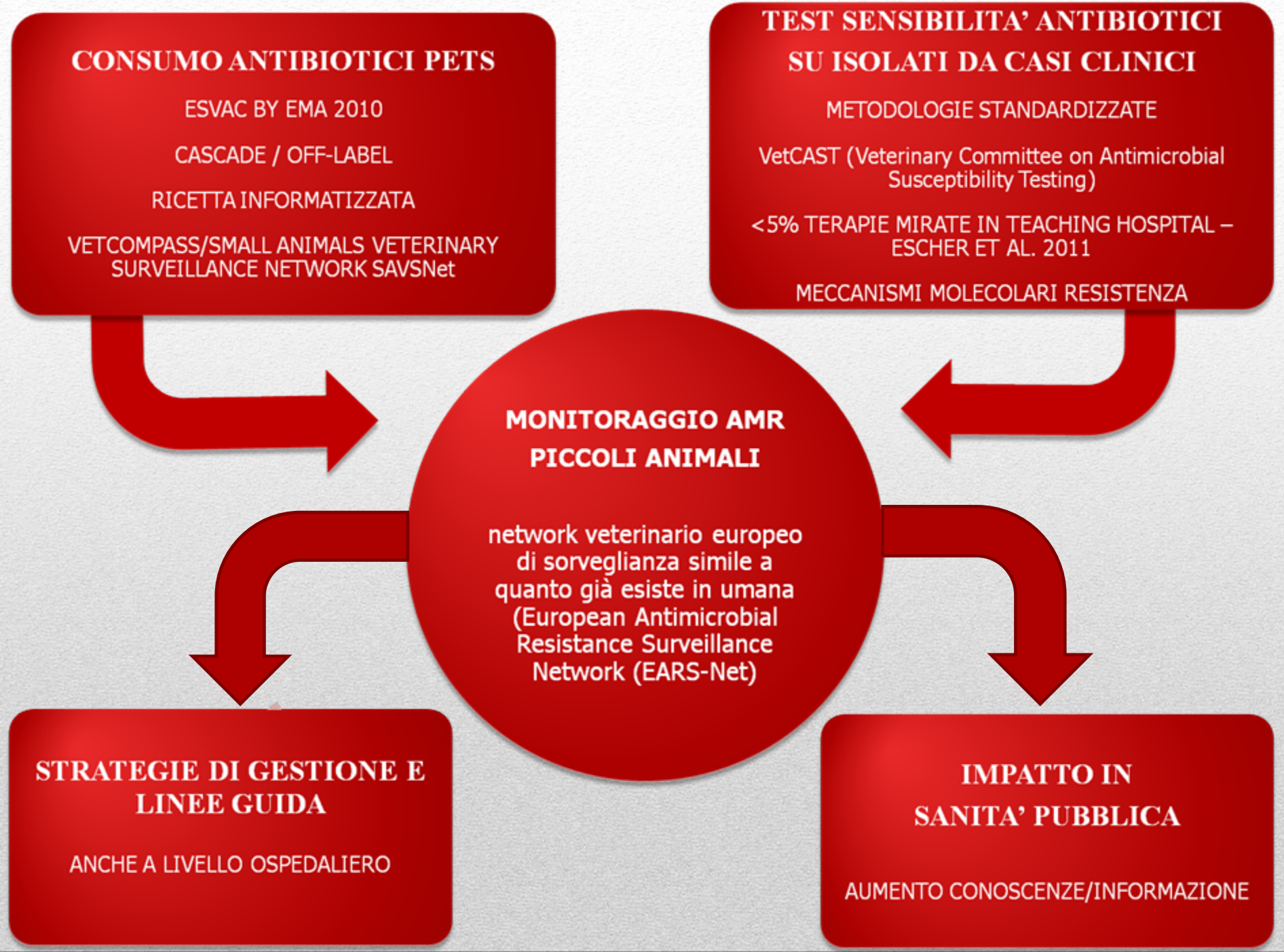
- **7 milioni di cani**

- 30 milioni di pesci
- 13 milioni di uccelli

- 2 milioni di roditori
- 1,5 milioni di rettili



Adattato da Guardabassi *et al.*, 2004


CONSUMO ANTIBIOTICI PETS
ESVAC BY EMA 2010
CASCADE / OFF-LABEL
RICETTA INFORMATIZZATA
VETCOMPASS/SMALL ANIMALS VETERINARY SURVEILLANCE NETWORK SAVSNet
TEST SENSIBILITA' ANTIBIOTICI SU ISOLATI DA CASI CLINICI
METODOLOGIE STANDARDIZZATE
VetCAST (Veterinary Committee on Antimicrobial Susceptibility Testing)
<5% TERAPIE MIRATE IN TEACHING HOSPITAL – ESCHER ET AL. 2011
MECCANISMI MOLECOLARI RESISTENZA
MONITORAGGIO AMR PICCOLI ANIMALI
network veterinario europeo di sorveglianza simile a quanto già esiste in umana (European Antimicrobial Resistance Surveillance Network (EARS-Net)
STRATEGIE DI GESTIONE E LINEE GUIDA
ANCHE A LIVELLO OSPEDALIERO
IMPATTO IN SANITA' PUBBLICA
AUMENTO CONOSCENZE/INFORMAZIONE

...UNO STUDIO MULTICENTRICO EUROPEO SU AMR IN PETS

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BMC Veterinary Research

RESEARCH ARTICLE Open Access

European multicenter study on antimicrobial resistance in bacteria isolated from companion animal urinary tract infections

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- ✓ Studio multicentrico retrospettivo realizzato sotto l'ombrello della European Society of Veterinary Nephrology and Urology
- ✓ Costituzione di un Urinary Tract Infection Resistance-Veterinary Network (UTIR-VNet)
- ✓ Obiettivo: determinare la frequenza di uropatogeni nel cane e nel gatto e valutare l'occorrenza e l'andamento temporale dell'antibioticoresistenza in un periodo di 6 anni (2008 – 2013)

...UNO STUDIO MULTICENTRICO EUROPEO SU AMR IN PETS

- ✓ 14 paesi europei (16 labs)
- ✓ quasi tutti laboratori universitari di microbiologia clinica veterinaria
- ✓ considerati 22256 isolati in corso di UTI (15097 da cani e 5963 da gatti)

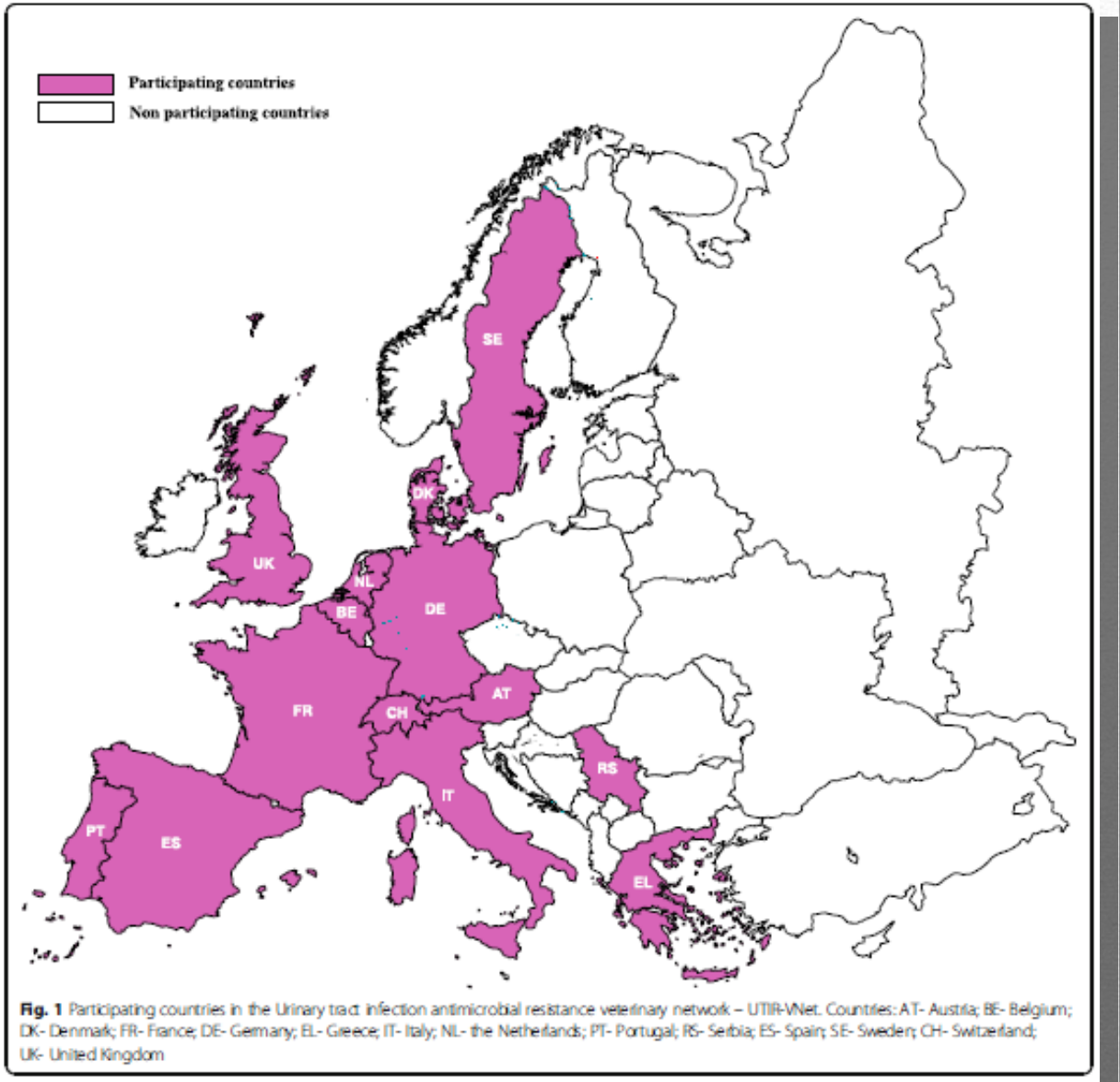


Fig. 1 Participating countries in the Urinary tract infection antimicrobial resistance veterinary network – UTIR-VNet. Countries: AT- Austria; BE- Belgium; DK- Denmark; FR- France; DE- Germany; EL- Greece; IT- Italy; NL- the Netherlands; PT- Portugal; RS- Serbia; ES- Spain; SE- Sweden; CH- Switzerland; UK- United Kingdom

...UNO STUDIO MULTICENTRICO EUROPEO SU AMR IN PETS

- ✓ Metodi di identificazione batteri: sistemi API, PCR e MALDI-TOF
- ✓ 15 antibiotici testati su tutti gli isolati mediante disk diffusion method (CLSI) tranne Svezia (Vet MIC, SVA), Danimarca e UK (COMPAN1F Sensititre Panels, Thermo Fisher), Svizzera e Belgio (VITEK 2 BioMerieux)
- ✓ Sono stati inclusi i seguenti antimicrobici: amoxicillin clavulanate (AMC), ampicillin (AMP), cefotaxime (CTX), cefovecin (CVN), cefoxitin (FOX), ceftazidime (CAZ), cefpodoxime (CPD), ceftiofur (EFT), ciprofloxacin (CIP), enrofloxacin (ENR), gentamicin (CN), marbofloxacin (MAR), oxacillin (OX), penicillin (P) and trimethoprim/ sulfamethoxazole (SXT)
- ✓ Utilizzati i breakpoint stabiliti per l'uomo da CLSI (M100-S25, 2015)

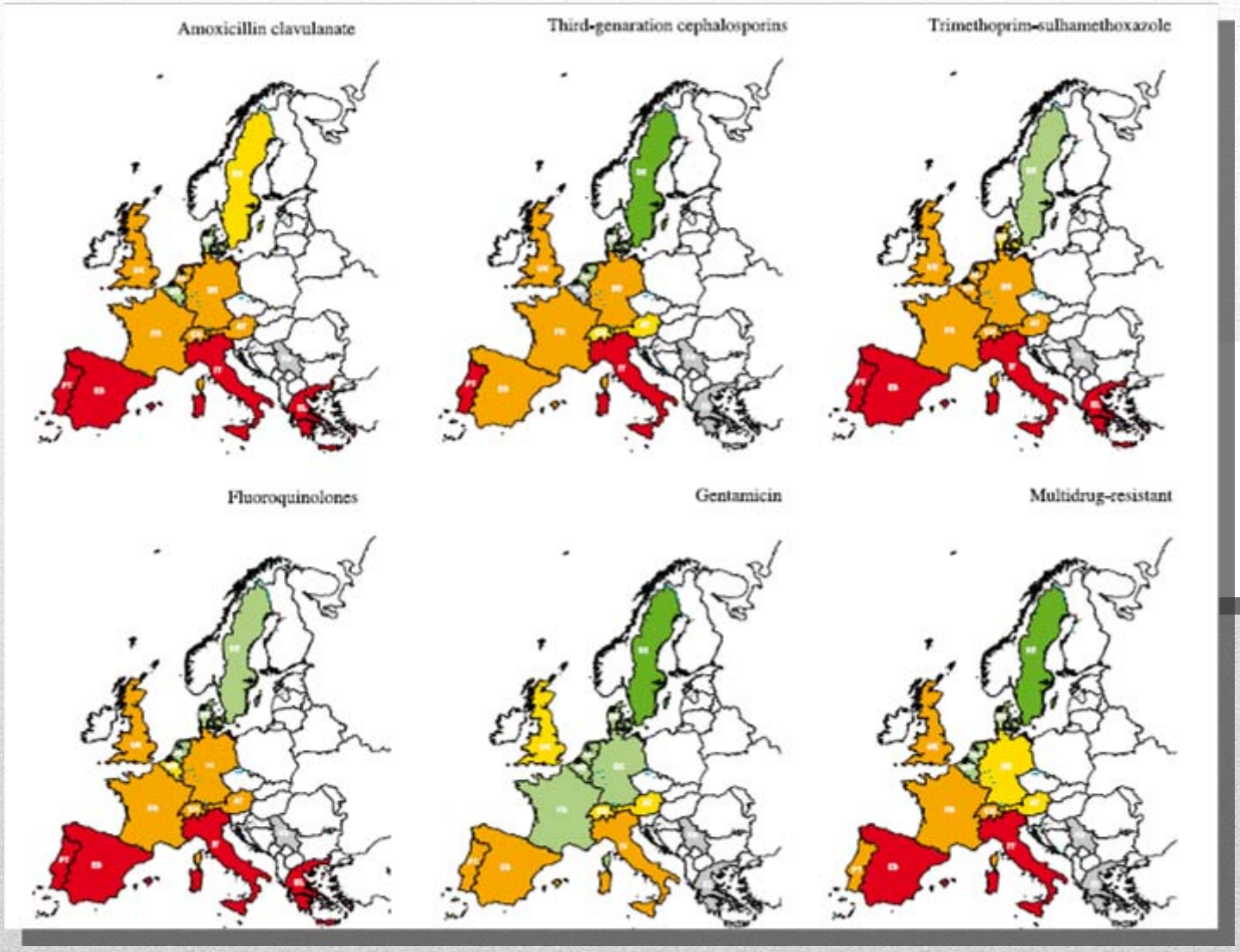
FREQUENZA DI UROPATOGENI NEL CANE E NEL GATTO

Table 2 Uropathogenic bacteria aetiology, single versus mixed infections and cat versus dog as host species

Organism	Overall		Single organism		Mixed infections			Dogs		Cats		
	n	% (95 % CI)[a]	*n*	% (95 % CI)[a]	*n*	% (95 % CI)[a]	*P*	*n*	% (95 % CI)[a]	*n*	% (95 % CI)[a]	*P*
Enterobacter spp.	308	1.38 (1.23–1.54)	244	1.22 (1.07–1.38)	64	2.75 (2.09–3.42)	**<0.0001**	194	1.21 (1.04–1.38)	114	1.81 (1.48–2.14)	**0.0008**
Enterococcus spp.	1506	6.77 (6.44–7.10)	1129	5.66 (5.34–5.99)	377	16.22 (14.72–17.72)	**<0.0001**	745	4.66 (4.34–4.99)	761	12.11 (11.31–12.92)	**<0.0001**
Escherichia coli	13231	59.45 (58.80–60.09)	12417	62.30 (61.62–62.97)	814	35.03 (33.09-36-97)	**<0.0001**	9506	59.51 (58.75–60.27)	3725	59.30 (58.08–60.51)	0.7832
Klebsiella spp.	478	2.15 (1.96–2.34)	400	2.01 (1.81–2.20)	78	3.36 (2.62–4.09)	**<0.0001**	385	2.41 (2.17–2.65)	93	1.48 (1.18–1.78)	**<0.0001**
Proteus spp.	1992	8.95 (8.58–9.33)	1770	8.88 (8.49–9.28)	222	9.55 (8.36–10.75)	0.2824	1869	11.70 (1.20–1.22)	123	1.96 (1.62–2.30)	**<0.0001**
Pseudomonas spp.	389	1.75 (1.58–1.92)	315	1.58 (1.41–1.75)	74	3.18 (2.47–3.90)	**<0.0001**	293	1.83 (1.63–2.04)	96	1.53 (1.22–1.83)	0.1249
Staphylococcus spp.	2893	13.00 (12.56–13.44)	2519	12.64 (12.18–13.10)	374	16.09 (14.60–17.59)	**<0.0001**	1836	11.49 (11.00–11.99)	1057	16.83 (15.90–17.75)	**<0.0001**
Streptococcus spp.	802	3.60 (3.36–3.85)	586	2.94 (2.71–3.17)	216	9.29 (8.11–10.47)	**<0.0001**	675	4.23 (3.91–4.54)	127	2.02 (1.67–2.37)	**<0.0001**
Other	657	2.95 (2.73–3.17)	552	2.77 (2.54–3.00)	105	4.52 (3.67–5.36)	-	471	2.95 (2.69–3.21)	186	2.96 (2.54–3.38)	-

[a]95 % CI, 95 % Confidence interval
n – Total number of isolates
P- P value obtained by Fisher exact test when comparing single versus mixed infections and cat versus dog as host. Statistically significant values are highlighted in bold

OCCORRENZA E ANDAMENTO TEMPORALE AMR



% AMR *Escherichia coli* 2012-2013

OCCORRENZA E ANDAMENTO TEMPORALE AMR

Table 3 Percentage of resistance in *Escherichia coli* by antimicrobial and country in 2012–2013

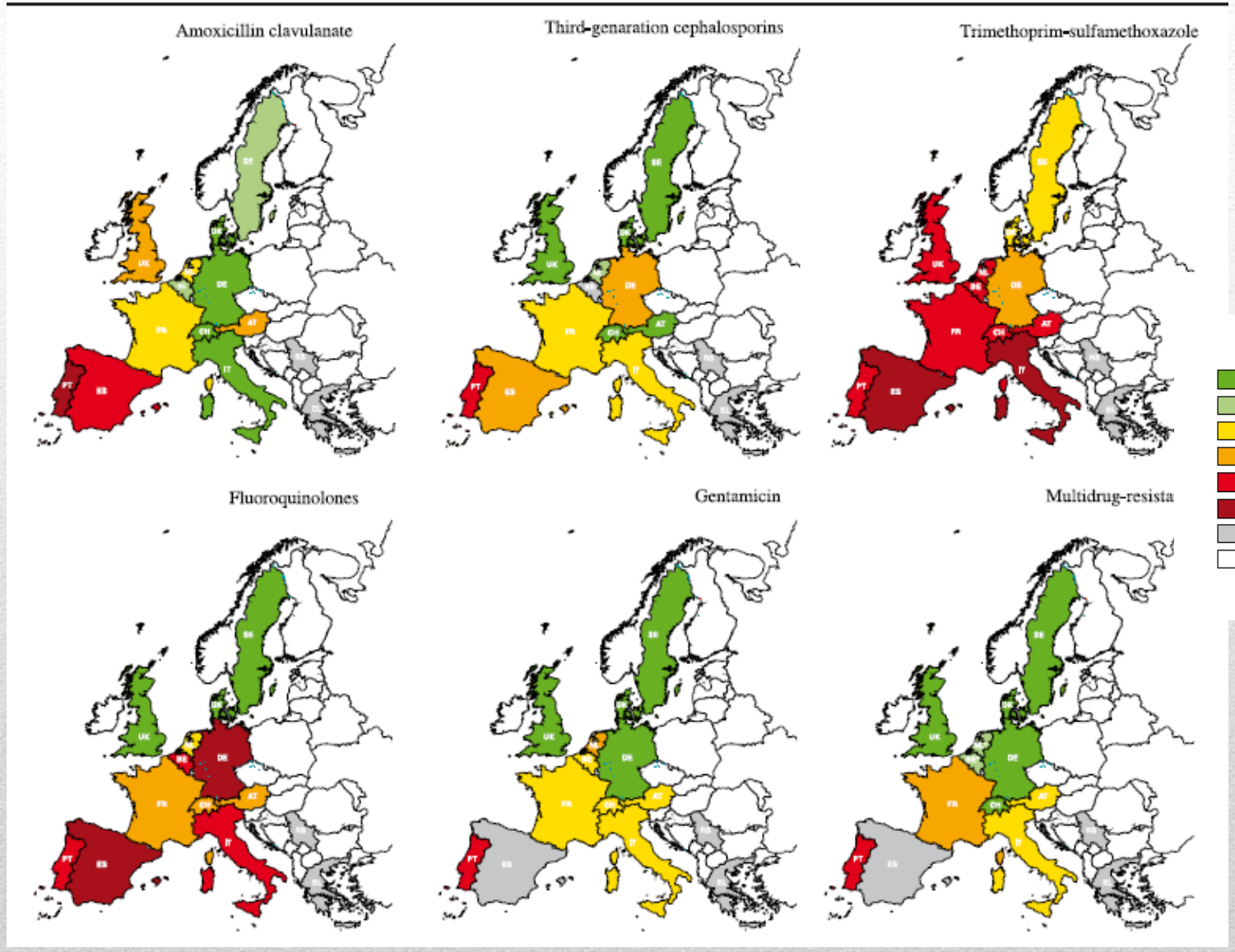
Country[a]	AMC		3GC		FLU		CN		SXT		Combined resistance		
	n	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% MDR (95 % CI)[b] [Stat. Dif.][c]	% FullS (95 % CI)[b] [Stat. Dif.][c]
DK	206	2.88 (0.61–5.16) [c]	208	4.33 (1.41–7.09) [a, c]	208	2.88 (0.61–5.16) [c]	208	1.92 (0.06–3.79) [a, c]	208	8.17 (4.45–11.90) [a, c]	208	2.88 (0.61–5.16) [b]	88.94 (84.68–93.20) [b, c]
IT	69	26.09 (15.73–36.45) [e, f]	69	24.64 (14.47–34.80) [e]	69	31.88 (20.89–42.88) [e]	69	14.49 (6.19–22.80) [e]	69	28.99 (18.28–39.69) [e, f]	69	28.99 (18.28–39.69) [d]	63.77 (52.43–75.11) [d, e, f]

% AMR *Escherichia coli* 2012-2013

Table 7 Temporal trends of antimicrobial resistance in *Escherichia coli* by country

Country[a] (Years)	AMC	3GC	FLU	CN	SXT	MDR	FullS
	OR[b] (95 % CI)[c] *P* value	OR[b] (95 % CI)[c] *P* value	OR[b] (95 % CI)[c] *P* value	OR[b] (95 % CI)[c] *P* value	OR[b] (95 % CI)[c] *P* value	OR[b] (95 % CI)[c] *P* value	OR[b] (95 % CI)[c] *P* value
BE (2010–13)	**0.787 (0.646–0.960) 0.0180**	- - -	**0.749 (0.635–0.882) 0.0006**	**0.677 (0.507–0.904) 0.0081**	**0.796 (0.695–0.912) 0.0010**	**0.529[d] (0.393–0.712) <0.0001**	**1.275[d] (1.127–1.442) 0.0001**
DK (2008–13)	**0.698 (0.500–0.976) 0.0357**	0.869 (0.646–1.169) 0.3533	**0.742 (0.565–0.976) 0.0325**	0.926 (0.620–1.384) 0.7086	**0.793 (0.642–0.980) 0.0316**	0.874 (0.615–1.242) 0.4528	**1.396 (1.156–1.684) 0.0005**
FR (2010–13)	0.885 (0.780–1.005) 0.0606	**0.859 (0.749–0.987) 0.0314**	**0.822 (0.727–0.928) 0.0016**	0.938 (0.734–1.200) 0.6121	0.960 (0.853–1.080) 0.4997	0.901 (0.782–1.037) 0.1448	**1.112 (1.002–1.233) 0.0456**
DE (2009–13)	1.029 (0.779–1.358) 0.8424	1.076 (0.805–1.438) 0.6211	1.185 (0.912–1.540) 0.2037	0.856 (0.520–1.409) 0.5397	1.040 (0.831–1.302) 0.7317	1.111 (0.801–1.541) 0.5295	0.941 (0.780–1.136) 0.5281
EL[e] (2009–13)	1.534 (0.851–2.766) 0.1545	1.083 (0.586–2.003) 0.7992	0.924 (0.630–1.355) 0.6855	- - -	0.880 (0.596–1.301) 0.5229	- - -	- - -
IT (2009–2013)	1.175 (0.844–1.637 0.3391)	1.017 (0.749–1.383) 0.9127	0.828 (0.629–1.090) 0.1784	1.007 (0.700–1.449) 0.9686	0.769 (0.582–1.016) 0.0645	1.065 (0.761–1.490) 0.7147	1.248 (0.953–1.634) 0.1076
NL (2008–13)	**1.108 (1.026–1.197) 0.0088**	**0.465 (0.402–0.539) <0.0001**	**0.916 (0.841–0.999) 0.0464**	0.682 (0.327–1.422) 0.3071	**0.917 (0.859–0.978) 0.0083**	**0.380[d] (0.320–0.450) <0.0001**	**1.648[d] (1494.–1.818) <0.0001**
PT (2008–13)	1.139 (0.913–1.419) 0.2482	1.187 (0.945–1.492) 0.1411	1.029 (0.823–1.287) 0.8029	1.222 (0.899–1.660) 0.2010	1.087 (0.867–1.364) 0.4680	1.156 (0.898–1.488) 0.2601	0.797 (0.629–1.010) 0.0608
ES (2010–13)	1.372 (0.855–2.201) 0.1899	1.551 (0.857–2.808) 0.1474	0.801 (0.529–1214) 0.2965	0.859 (0.467–1.578) 0.6238	0.752 (0.489–1.156) 0.1939	1.237 (0.677–2.258) 0.4897	0.944 (0.570–1.564) 0.8234
SE (2008–13)	0.976 (0.915–1.041) 0.4569	- - -	0.980 (0.827–1.147) 0.8018	**0.700 (0.562–0.872) 0.0015**	0.961 (0.892–1.037) 0.3059	**0.697 (0.493–0.985) 0.0407**	1.035 (0.965–1.110) 0.3341
CH (2008–13)	1.143 (0.905–1.445) 0.2621	1.116 (0.861–1.447) 0.4067	1.007 (0.841–1.205) 0.9426	**1.493 (1.009–2.208) 0.0451**	1.080 (0.901–1.294) 0.4050	1.189 (0.920–1.536) 0.1863	1.025 (0.877–1.197) 0.7594
UK (2008–13)	1.075 (0.857–1.357) 0.5194	1.106 (0.873–1.400) 0.4041	0.945 (0.739–1.208) 0.6511	1.306 (0.792–2.155) 0.2952	0.972 (0.797–1.185) 0.7778	1.355 (0.954–1.925) 0.0892	1.154 (0.950–1.401) 0.1492

OCCORRENZA E ANDAMENTO TEMPORALE AMR



% AMR *Proteus* spp. 2012-2013

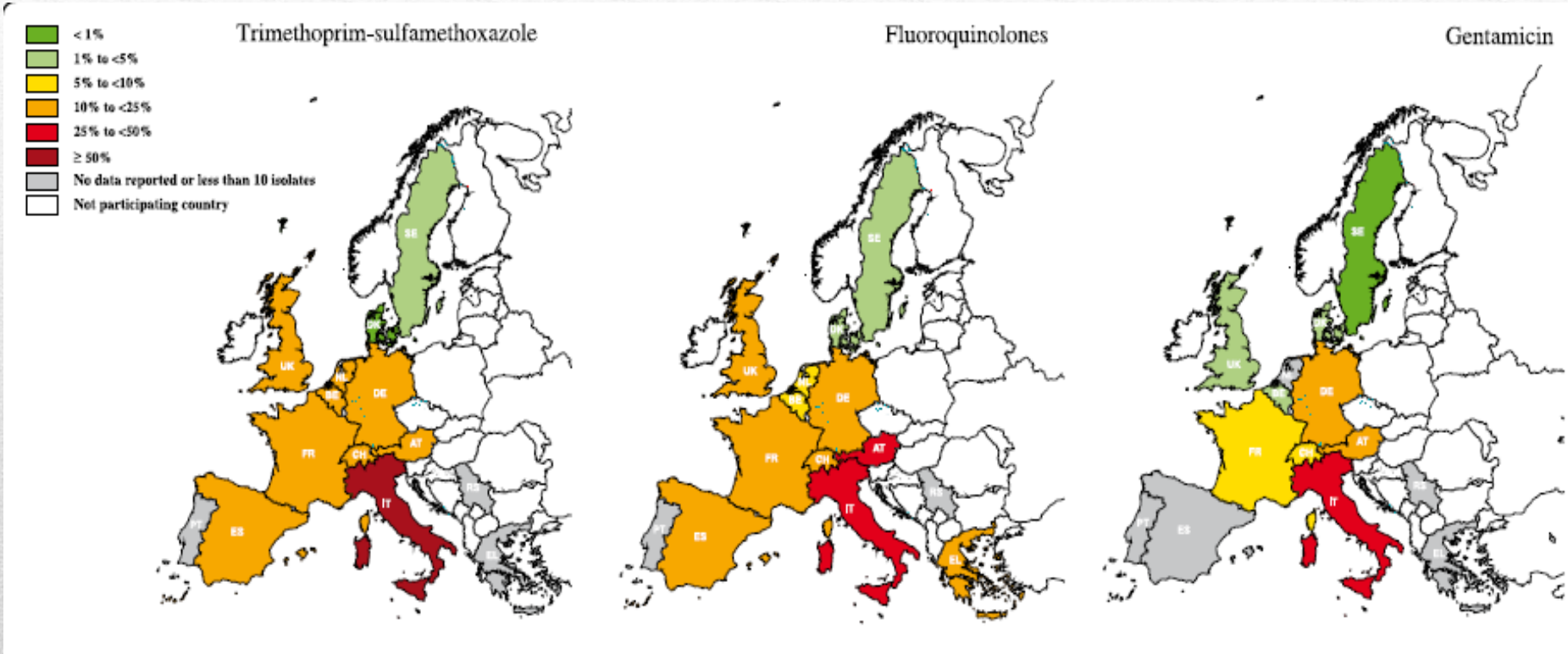
OCCORRENZA E ANDAMENTO TEMPORALE AMR

Table 4 Percentage of resistance in *Proteus* spp. by antimicrobial and country in 2012-2013

Country[a]	AMC		3GC		FLU		CN		SXT		Combined resistance		
	n	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% MDR (95 % CI)[b] [Stat. Dif.][c]	% FullS (95 % CI)[b] [Stat. Dif.][c]
DK	31	0 [a, d]	31	0 [a, b]	31	0 [e, f]	31	0 [a, b]	31	6.45 (0.00–15.10) [c]	31	0 [a, b]	93.55 (44.41–84.90) [c]
IT	12	0 [a, b, c]	12	8.33 (0.00–23.97) [a, b, c]	12	41.67 (13.77–69.56) [a, d, g]	12	8.33 (0.00–23.97) [a, b, c]	12	66.67 (39.99–93.34) [b, e]	12	8.33 (0.00–23.97) [a, b, c]	16.67 (0.00–37.75) [d]

% AMR *Proteus* spp. 2012-2013

OCCORRENZA E ANDAMENTO TEMPORALE AMR



% AMR *Staphylococcus* spp. 2012-2013

OCCORRENZA E ANDAMENTO TEMPORALE AMR

Table 6 Percentage of resistance in *Staphylococcus* spp. by antimicrobial and country in 2012–2013

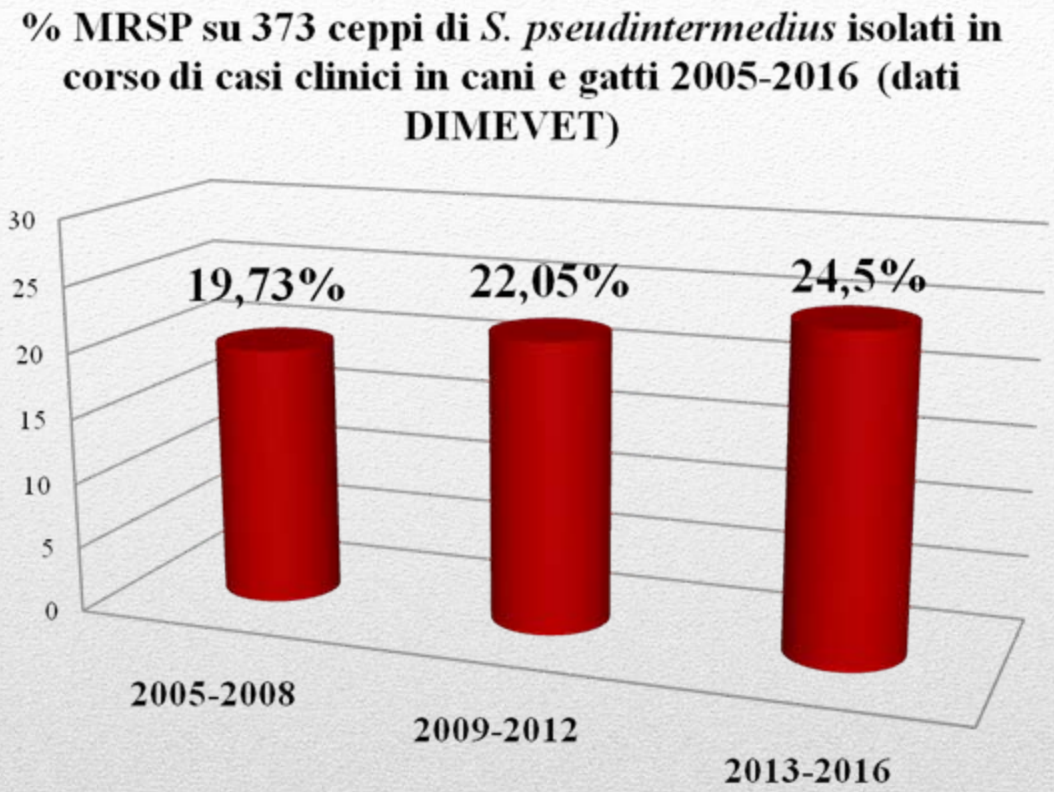
Country[a]	FLU		CN		SXT	
	n	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]	*n*	% R (95 % CI)[b] [Stat. Dif.][c]
DK	51	1.96 (0.00–5.77) [c, e, f]	51	3.92 (0.00–9.25) [b]	51	0 - [d]
IT	19	42.11 (19.90–64.31) [a]	19	26.32 (6.52–46.12) [a]	19	63.16 (41.47–84.85) [e]

% AMR *Staphylococcus* spp. 2012-2013

Staphylococcus spp. e meticillino-resistenza nei diversi paesi nel 2012-2013

Country[a]	Methicillin-resistance within each group			
	MRSA		MRSP	
	n tested	R % (95 % CI)[b]	*n* tested	R % (95 % CI)[b]
AT	5	1R/4S -	15	33.33 (9.48–57.19)
BE	18	5.56 (0–16.14)	64	12.50 (4.40–20.60)
DK	1	1S -	27	0 -
FR	20	40.0 (18.53–61.47)	0	- -
DE	0	- -	0	- -
EL	-	- -	1	1R -
IT	-	- -	18	50.0 (26.90–73.10)
NL	0	- -	174	10.92 (6.29–15.55)
PT	1	1R -	4	2R/2S -
RS	-	- -	-	- -
ES	-	- -	-	- -
SE	28	0 -	174	1.15 (0–2.73)
CH	2	0R/2S -	20	10.00 (0–23.15)
UK	3	1R/2S -	12	8.33 (0–23.97)

ANDAMENTO TEMPORALE MRSP IN CANI E GATTI - BOLOGNA



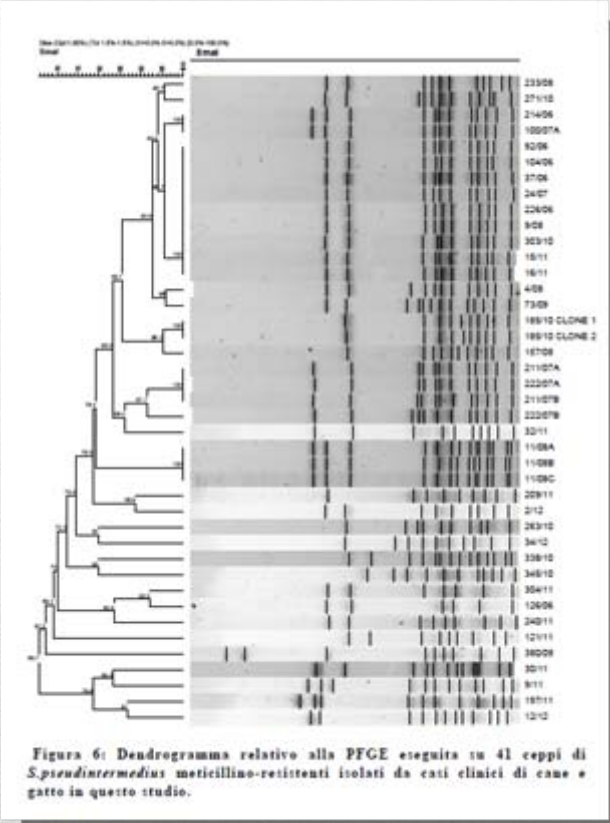


Figura 6: Dendrogramma relativo alla PFGE eseguita su 41 ceppi di *S.pseudintermedius* meticillino-resistenti isolati da casi clinici di cane e gatto in questo studio.

Alla MLST l'85% dei 113 ceppi di MRSP sono risultati appartenere al sequence type (ST) 71

GRAZIE PER L'ATTENZIONE