EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

Joint Interagency Antimicrobial Consumption and Resistance Analysis (JIACRA) Report

ESVAC stakeholders meeting, 3 March 2015

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Joint Interagency Antimicrobial Consumption and Resistance Analysis (JIACRA) Report

ECDC/EFSA/EMA first joint report on the integrated analysis of the consumption of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from humans and food-producing animals.

Published by the 3 Agencies on their webs on Friday 30 January*.

*EMA link: http://www.ema.europa.eu/docs/en_GB/document_library/Report/2015/01/WC500181485.pdf

CVMP and the JIACRA report

The European Medicines Agency approved the report on 16 January 2015.

Before endorsement the report was circulated for consideration to the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) network.

The report was circulated to the 13-15 January 2015 CVMP plenary meeting for information.

Consumption and resistance in animals

A positive association was observed between antimicrobial consumption in food-producing animals and occurrence of resistance in bacteria from such animals.

The strongest associations between consumption and resistance in animals were detected for the antimicrobials studied in relation to indicator *Escherichia coli*. Positive associations were also noted for *Salmonella* spp. and *Campylobacter* spp.

Consumption and resistance in humans

A positive association was observed between the total consumption of 3rd- and 4th-generation cephalosporins in humans and the occurrence of resistance to 3rd-generation cephalosporins in *E. coli* from humans.

A positive association was also observed between the total consumption of fluoroquinolones in humans and the occurrence of fluoroquinolone resistance in *E. coli* from humans.

No association was found between the consumption of fluoroquinolones in humans and the occurrence of fluoroquinolone resistance in *Salmonella* spp., *S. enterica* subsp. *enterica* serovar Enteritidis and *S.* Typhimurium from cases of human infection.

Consumption and resistance animals - humans

For both cephalosporins and fluoroquinolones, positive associations were also notably found between occurrence of resistance in indicator *E. coli* originating from animals and the occurrence of resistance in *E. coli* from humans.

No associations were observed between the consumption of 3rd- and 4th-generation cephalosporins in food-producing animals and the occurrence of resistance to this sub-class in selected bacteria from humans.

Consumption and resistance animals - humans

No associations were observed for consumption of fluoroquinolones in food-producing animals and the occurrence of resistant *Salmonella* spp. and *Campylobacter* spp. from humans.

Positive associations were noted for consumption of macrolides in food-producing animals and the occurrence of resistance in *Campylobacter* spp. from cases of human infection, and for consumption of tetracyclines and the occurrence of resistance in *Salmonella* spp. and *Campylobacter* spp.

Caveats

- Data on antimicrobial consumption in food-producing animals are not available by species.
  - To analyse the relationship between consumption of antimicrobials and resistance in bacteria from food-producing animals, a summary indicator of resistance in the main three food-producing animals species was calculated.
- Differences in the systems for collection and reporting of data on antimicrobial consumption and resistance in bacteria from humans and food-producing animals have limited the potential for direct comparison.
- The results should be interpreted with caution.

Consumption expressed as biomass

In 2012 the average consumption expressed in mg per kg of estimated biomass was 116.4 mg/kg in humans (range: 56.7 – 175.8 mg/kg) and 144.0 mg/kg in animals (range: 3.8 – 396.5 mg/kg).

Consumption in food-producing animals was lower or much lower than in humans in 15 of 26 countries, in three countries they were similar, and in eight countries consumption in food-producing animals was higher or much higher than in humans.

Overall consumption of antimicrobials (population weighted mean) was higher for animals than for humans.

Total tonnes of active substance and estimated biomass

In 2012, 3 400 and 7 982 tonnes of active substance of antimicrobials were sold for use in humans and food-producing animals, respectively, in the 26 EU/EEA countries.

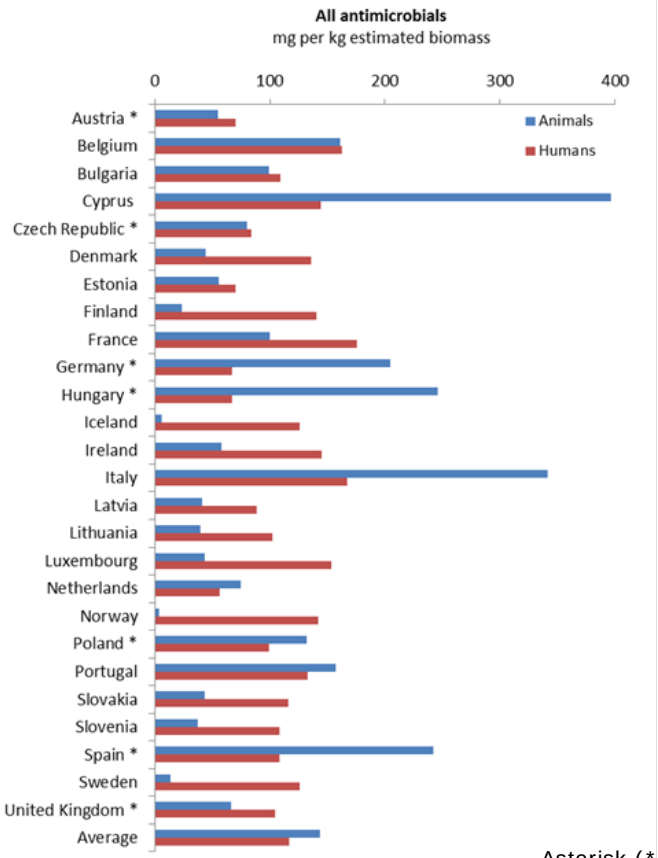
The estimated biomass, expressed as 1000-tonnes, was 28 884 for humans and 55 421 for animals.

(more details in the table on the next slide)

Consumption of antimicrobials for humans and animals in tonnes, the estimated biomass of respective populations in 1000 tonnes and consumption expressed as milligrams per kilogram biomass in 26 EU/EEA countries in 2012

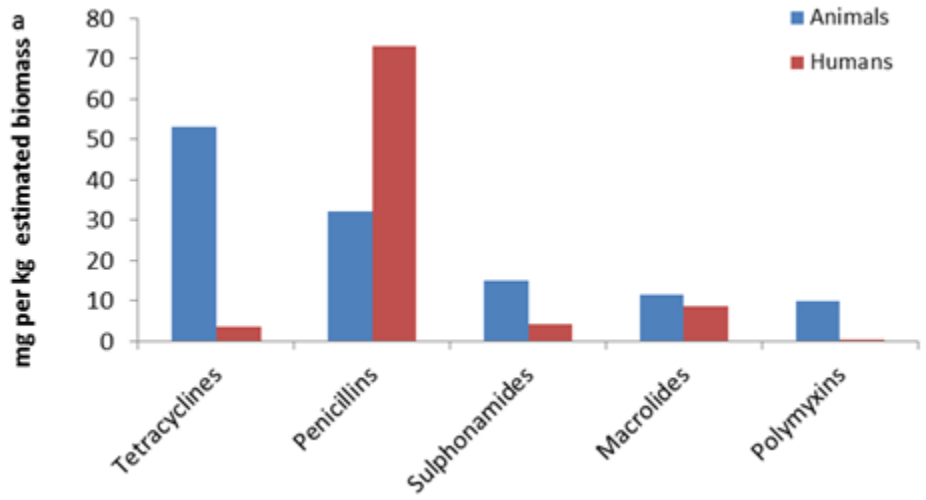
Country	Consumption in hospitals included	Consumption in tonnes active substance			Estimated biomass in 1000-tonnes			Consumption in mg/kg biomass	
		Humans	Animals	Total	Humans	Animals	Total	Humans	Animals
Austria	No	37.1	53.0	90.1	528	966	1 494	70.2	54.9
Belgium	Yes	112.7	267.2	379.9	693	1 658	2 351	162.6	161.1
Bulgaria	Yes	49.8	38.4	88.2	455	388	843	109.4	98.9
Cyprus	Yes	7.8	45.0	52.8	54	113	167	144.4	396.5
Czech Republic	No	55.2	53.7	108.9	657	673	1 330	84.1	79.8
Denmark	Yes	47.5	107.0	154.5	349	2 424	2 773	136.2	44.1
Estonia	Yes	5.9	7.3	13.2	84	131	215	70.1	56.0
Finland	Yes	47.3	12.2	59.5	338	511	849	140.1	23.8
France	Yes	719.2	761.5	1 480.7	4 092	7 618	11 710	175.8	99.1
Germany	No	291.7	1 707.5	1 999.2	4 357	8 338	12 695	66.9	204.8
Hungary	No	41.3	178.5	219.8	611	727	1 338	67.5	245.5
Iceland	Yes	2.5	0.7	3.2	20	116	136	125.9	5.9
Ireland	Yes	41.5	100.0	141.5	286	1 725	2 011	144.9	58.0
Italy	Yes	621.6	1 534.3	2 155.9	3 712	4 500	8 212	167.5	341.0
Latvia	Yes	11.3	6.7	18.0	128	162	290	88.8	44.1
Lithuania	Yes	19.2	13.4	32.6	188	339	527	102.0	39.4
Luxembourg	Yes	4.8	2.2	7	31	50	81	153.1	43.6
Netherlands	Yes	54.5	245.7	300.2	963	3 279	4 242	56.7	74.9
Norway	Yes	44.1	7.1	51.2	312	1 851	2 163	141.6	3.8
Poland	No	238.5	516.4	754.9	2 408	3 908	6 316	99.0	132.2
Portugal	Yes	83.0	156.5	239.5	624	996	1 620	133.1	157.1
Slovakia	Yes	39.2	10.2	49.4	338	235	573	115.9	43.2
Slovenia	Yes	13.9	6.8	20.7	129	183	312	108.3	37.0
Spain	No	320.7	1 693.0	2 013.7	2 954	6 996	9 950	108.6	242.0
Sweden	Yes	74.8	10.6	85.4	593	783	1 376	126.2	13.5
United Kingdom	No	414.9	447.4	862.3	3 982	6 749	10 731	104.2	66.3
All		**3 399.8**	**7 982.0**	11 381.8	**28 884**	**55 421**	84 305	**116.4**	**144.0**

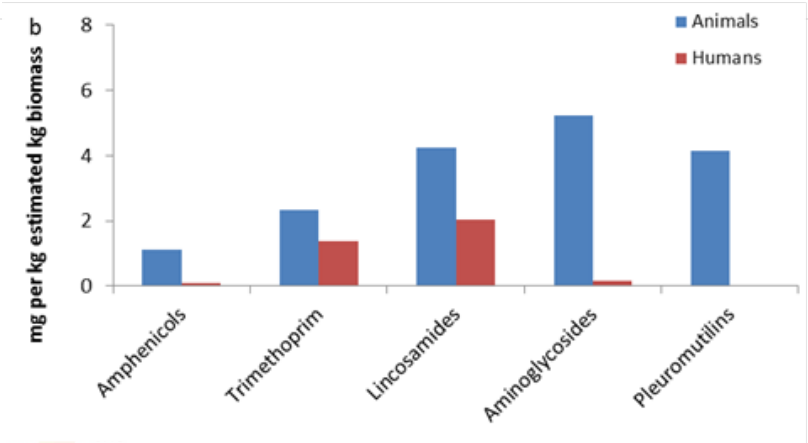
Comparison of biomass-corrected consumption of antimicrobials (milligrams per kilogram estimated biomass) in humans and animals by country in 26 EU/EEA countries in 2012



Asterisk (*) denotes that only community consumption data were available for human medicine. Figures of human sales from these countries probably represent a considerable underestimate.

Comparison of consumption of selected antimicrobial classes for humans and food-producing animals in 26 EU/EEA countries in 2012





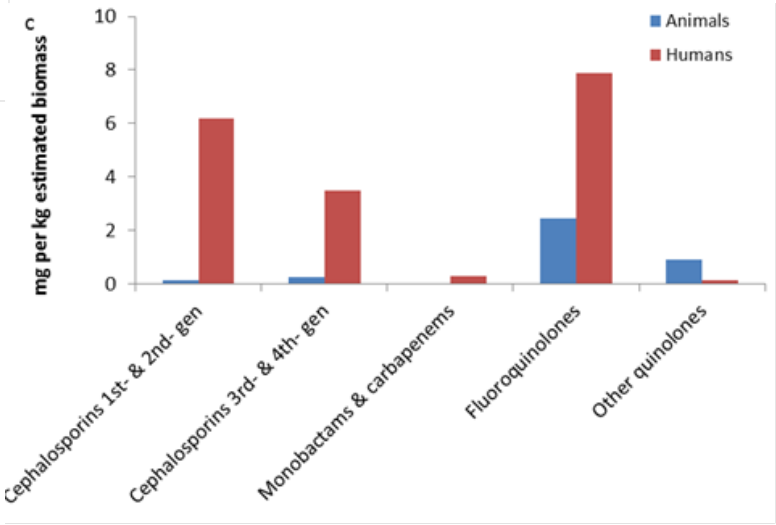
Highest selling AMs classes:

- Human medicine:

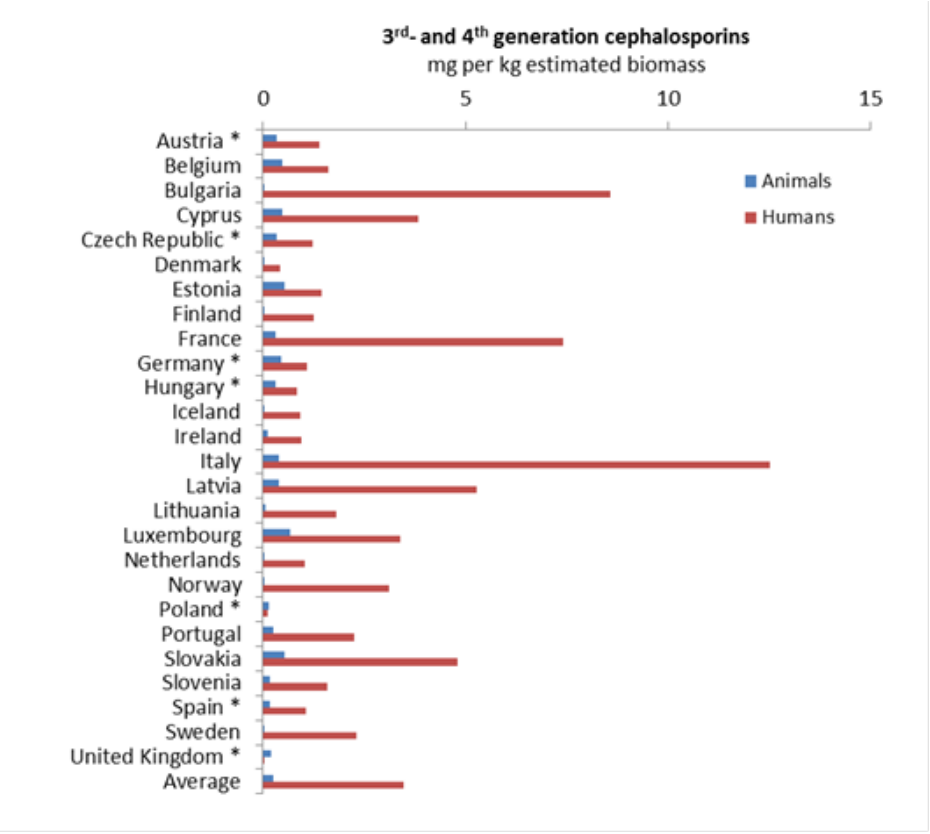
penicillins, macrolides, fluoroquinolones

- Food-producing animals:

tetracyclines, penicillins, sulphonamides



Biomass-corrected consumption of 3rd- and 4th-generation cephalosporins for humans and food-producing animals by country in 26 EU/EEA countries in 2012

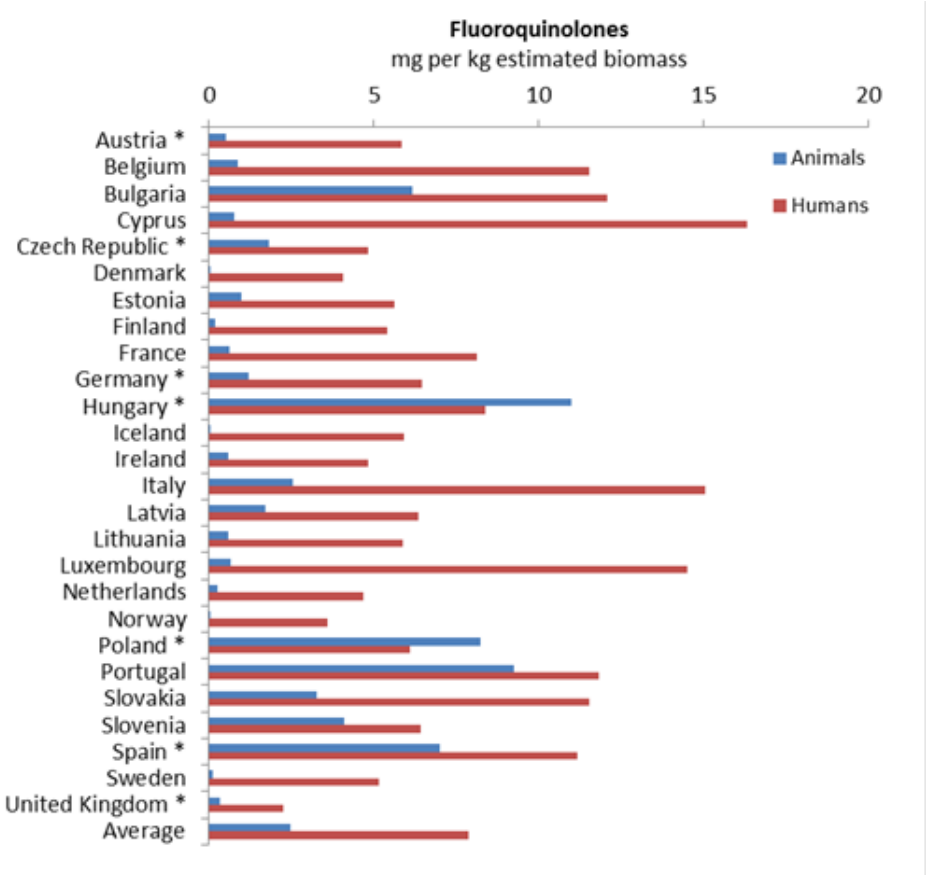


The consumption of 3rd- and 4th-generation cephalosporins was much lower for animals than for humans.

This antimicrobial class is predominantly used in hospitals, and therefore the comparison may be misleading for countries not reporting (*) such hospital consumption.

Asterisk (*) denotes that only community consumption data were available for human medicine. Figures of human sales from these countries probably represent a considerable underestimate.

Population corrected consumption of fluoroquinolones for humans and food-producing animals by country in 26 EU/EEA countries in 2012



In most countries, the consumption of fluoroquinolones was lower for animals than for humans, but there was more variation between countries than for cephalosporins.

Asterisk (*) denotes that only community consumption data were available for human medicine.

Conclusions

Associations between the consumption of selected combinations of antimicrobials and the occurrence of resistance in bacteria were mostly, but not always, observed.

The epidemiology of resistance is complex, and several factors aside from antimicrobial consumption influence the occurrence of resistance.

Wide variations are between countries both in the overall consumption figures and for the consumption of the 3rd- and 4th-generation cephalosporins and fluoroquinolones.

Improvements of networks are ongoing.

Acknowledgements

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- EFSA: Scientific Network for Zoonosis Monitoring Data;
- EMA: ESVAC network.

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Thank you for your attention!