



XIV

Congresso Brasileiro de
Controle de Infecção e
Epidemiologia Hospitalar

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Uso de Antimicrobianos na Agropecuária

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Bebida adulterada

Ministério da Agricultura encontra antibiótico em vinhos gaúchos

Secretaria estadual diz que Estado não possui equipamento para detectar substância

por Cleidi Pereira

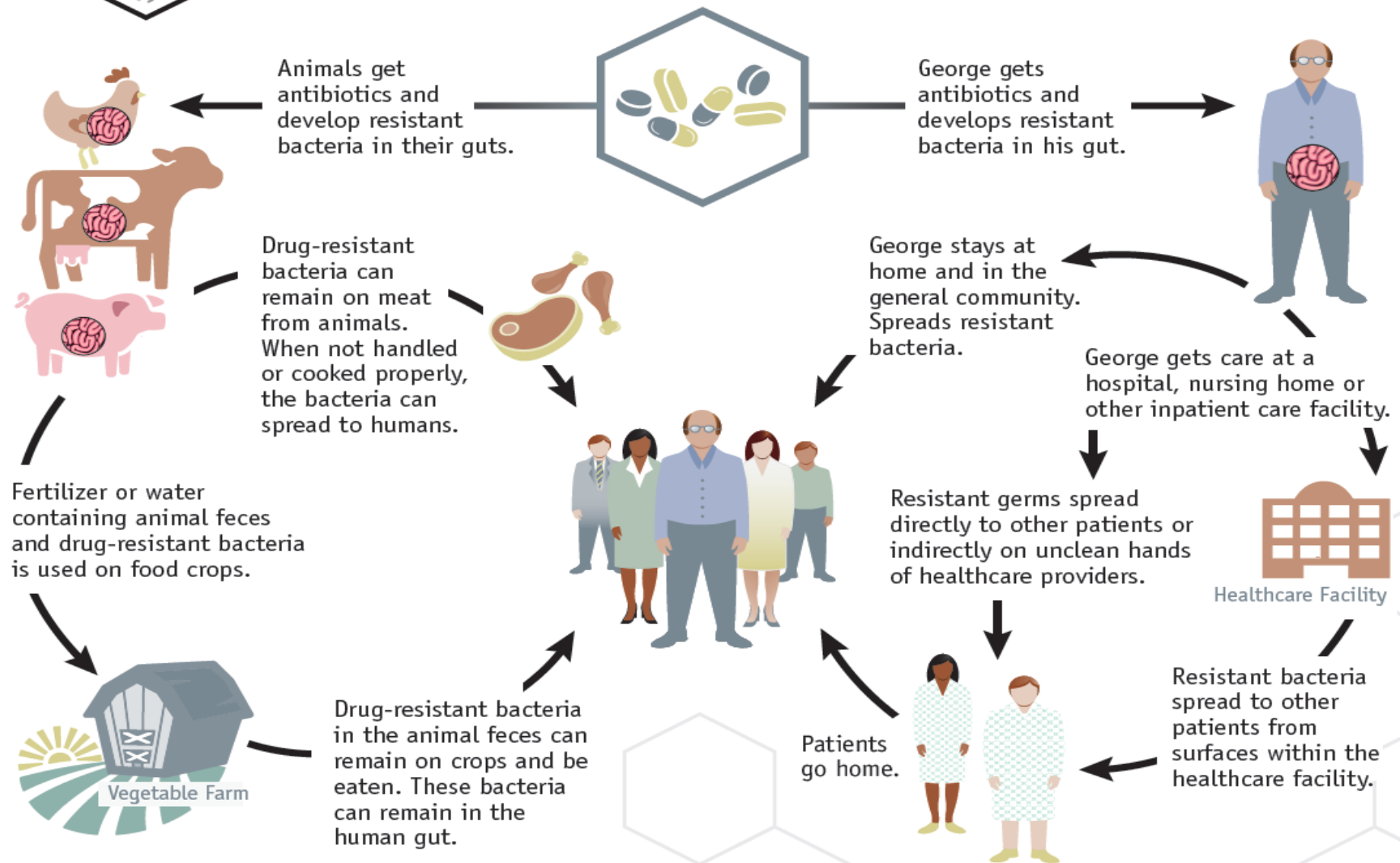
01/05/2014 | 15h12

O **Ministério da Agricultura** identificou a presença de antibióticos em vinhos de mesa produzidos no Rio Grande do Sul. As amostras foram coletadas no ano passado, em uma operação conjunta com a **Secretaria da Agricultura** (Seapa).





Examples of How Antibiotic Resistance Spreads



Simply using antibiotics creates resistance. These drugs should only be used to treat infections.

Antimicrobianos em Agropecuária

Melhoradores de Desempenho	Antimicrobianos terapêuticos	
Avilamicina	Amicacina	Enrofloxacina
Bacitracina	Amoxacilina	Carbenicilina
Colistina	Ampicilina	Gentamicina
Clorexidina	Amox/clavulonato	Marbofloxacina
Lincomicina	Cefalexina	Metronidazol
Flavomicina	Ciprofloxacina	Orbifloxacina
Halquinol	Clindamicina	Sulfadimetoxine
Ractopamina	Doxiciclina	Tetraciclina
Tilosina	Eritromicina	SMX/TMP

COMPORTAMENTO E IMPACTO AMBIENTAL DE ANTIBIÓTICOS USADOS NA PRODUÇÃO ANIMAL BRASILEIRA⁽¹⁾

R. Bras. Ci. Solo, 34:601-616, 2010

Jussara Borges Regitano⁽²⁾ & Rafael Marques Pereira Leal⁽³⁾

Quadro 2. Taxa de metabolismo dos principais grupos de antibióticos empregados na produção animal

Grupo farmacológico	Taxa de metabolismo no organismo animal
Tetraciclinas	Baixa
Macrolídeos	Baixa
Aminoglicosídeos	Baixa a elevada
Lincosamidas	Moderada
Fluoroquinolonas	Moderada a elevada
Sulfonamidas	Elevada

⁽¹⁾ Baixa: < 20 %; Moderada: de 20 a 80 %; Elevada: > 80 % da dose administrada. Fonte: Boxall et al. (2004).



Resistência antimicrobiana de bactérias do gênero *Listeria* spp. isoladas de carne moída bovina

Braz. J. vet. Res. anim. Sci., São Paulo, v. 45, n. 2, p. 116-121, 2008

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Tabela 1 - Comportamento das seis cepas de *L. monocytogenes* isoladas frente aos antimicrobianos testados.
Niterói – RJ, 2006

Antimicrobiano	Nº de cepas R	(%)	Nº de cepas I	(%)	Nº de cepas S	(%)
Gentamicina	6	100	0	0	0	0
Ampicilina	6	100	0	0	0	0
Cefoxitina	6	100	0	0	0	0
Clindamicina	6	100	0	0	0	0
Oxaciclina	6	100	0	0	0	0
Sulfazotrim	6	100	0	0	0	0
Eritromicina	5	83,3	0	0	1	16,7
Tetraciclina	4	66,7	0	0	2	33,3
Penicilina	4	66,7	0	0	2	33,3
Cefalotina	4	66,7	0	0	2	33,3
Ciprofloxacina	4	66,7	1	16,7	1	16,7
Amicacina	3	50	0	0	3	50
Vancomicina	3	50	0	0	3	50
Cloranfenicol	3	50	1	16,7	2	33,3
Rifampicina	3	50	1	16,7	2	33,3

Onde: R= resistentes / I= intermediárias / S= sensíveis

Quinolone-Resistant *Escherichia coli* O127a:K63 Serotype with an Extended-Spectrum-Beta-Lactamase Phenotype from a Food Poisoning Outbreak in China

Rongzhang Hao,^a Shaofu Qiu,^a Yong Wang,^a Guang Yang,^a Wenli Su,^a Lixue Song,^b Jia Zhang,^c Jiaxu Chen,^c Leili Jia,^a Ligui Wang,^a and Hongbin Song^a

Institute of Disease Control and Prevention, Academy of Military Medical Sciences, Beijing, China,^a The Military General Hospital of Beijing PLA, Beijing, China,^b and Institute of Parasitic Diseases, Chinese Center of Disease Control and Prevention, Shanghai, China^c

We report an atypical enteropathogenic *Escherichia coli* O127a:K63 strain with resistance to quinolones and extended-spectrum cephalosporins isolated from a 2010 food poisoning outbreak involving 112 adults in China. Two resistance genes [*bla*_{CTX-M-15}, *aac*(6')-Ib-c] and five mutations (two in *gyrA*, two in *parC*, one in *parE*) coexisted in this enteropathogenic *E. coli* strain.



Subgrouping of ESBL-producing *Escherichia coli* from animal and human sources: An approach to quantify the distribution of ESBL types between different reservoirs

**Table 1**

Overview of the isolates (n = 1329) used for pattern analysis and categorization in a study subgrouping ESBL-producing *E. coli* from animal and human sources in Germany.

Group	Study type	Number of isolates per study type	Source	Number of isolates per source
Livestock	Screening	297	Chicken	38
			Cattle	120
			Pigs	139
	Diagnostic	287	Chicken	11
			Cattle	203
			Pigs	73
Companion animals	Diagnostic	110	Dogs	29
			Horses	81
Human	Screening, diagnostic	635	General population	213
			Ambulant cases	145
			Nosocomial cases	277

PREVALENCE OF DRUG RESISTANCE AND VIRULENCE FEATURES IN *Salmonella* spp. ISOLATED FROM FOODS ASSOCIATED OR NOT WITH SALMONELLOSIS IN BRAZIL

Ruth Estela Gravato ROWLANDS(1), Christiane Asturiano RISTORI(1), Alice A. IKUNO(2), Maria Luisa BARBOSA(1), Miyoko JAKABI(1) & Bernadette Dora Gombossy de Melo FRANCO(3)

Table 2

Antimicrobial resistance among *Salmonella* spp. strains isolated from foods associated and not associated with foodborne salmonellosis

Resistance to	Associated with foodborne salmonellosis	Not associated with foodborne salmonellosis
STR	2 (4.8%)	57 (29.2%)
NAL	7 (16.7%)	28 (14.3%)
TET	--	3 (1.5%)
AMP	--	1 (0.5%)
GEN+STR	1 (2.4%)	5 (2.6%)
GEN+KAN	--	1 (0.5%)
TET+STR	--	6 (3.1%)
SSS+STR	--	2 (1.0%)
GEN+KAN+STR	1 (2.4%)	--
GEN+NAL+STR	2 (4.8%)	1 (0.5%)
TET+SSS+STR	--	2 (1.0%)
TET+KAN+STR	--	1 (0.5%)
TET+NAL+CHL+STR	--	2 (1.0%)
AMP+STX+SSS+STR	1 (2.4%)	--
Number of resistant strains	14 (33.3%)	109 (55.9%)

AMP, ampicillin; FOX, cefoxitin; CEF, cephalothin; CTX, cefotaxime; CHL, chloramphenicol; TET, tetracycline; AK, amikacin; GEN, gentamicin; STX, trimethoprim-sulphamethoxazole; CIP, ciprofloxacin; NAL, nalidixic acid; IPM, imipenem; KAN, kanamycin; SSS, sulphonamides; STR, streptomycin.

Resultados:

- 52% de resistência a dois ATM
- Resistência de 36% a estreptomicina e 17% ao ácido nalidíxico.

Pork Meat as a Potential Source of *Salmonella enterica* subsp. *arizonae* Infection in Humans

Grammato Evangelopoulou,^a Spyridon Kritas,^b Alexander Govaris,^c Angeliki R. Burriel^a

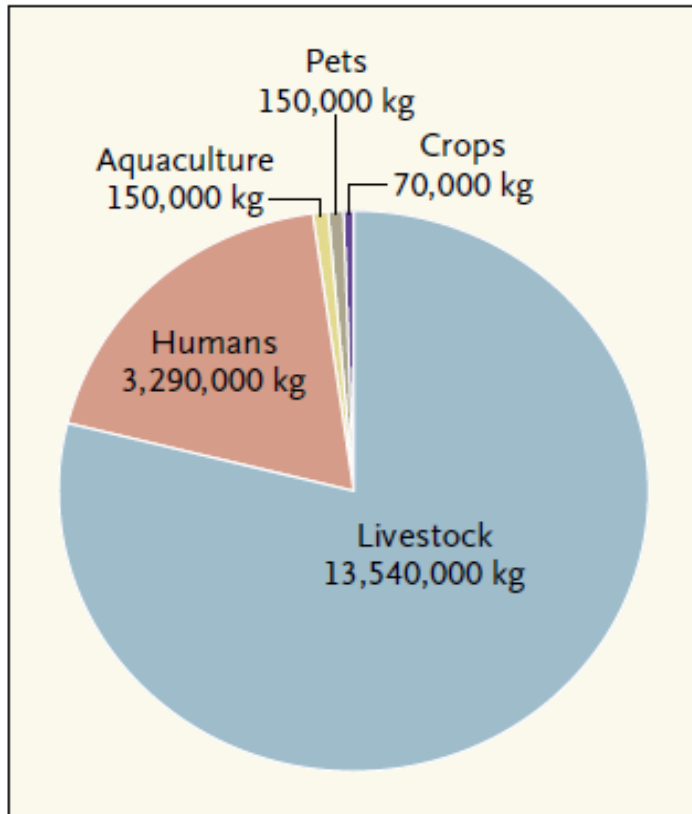
TABLE 1 Proportions of resistant and sensitive *S. enterica* subsp. *arizonae* isolates

Antimicrobial agent	No. (%) of isolates that were:	
	Resistant	Susceptible
Amoxicillin	8 (57.1)	6 (42.9)
Amoxicillin-clavulanic acid	5 (35.7)	9 (64.3)
Ampicillin	9 (64.3)	5 (35.7)
Ampicillin-sulbactam	0 (0)	14 (100)
Aztreonam	1 (7.1)	13 (92.9)
Cefotaxime	0 (0)	14 (100)
Cefoxitin	5 (35.7)	9 (64.3)
Ceftazidime	1 (7.1)	13 (92.9)
Ceftiofur	0 (0)	14 (100)
Ceftriaxone	0 (0)	14 (100)
Cefuroxime	0 (0)	14 (100)
Chloramphenicol	5 (35.7)	9 (64.3)
Colistin	3 (21.4)	11 (78.6)
Doripenem	0 (0)	14 (100)
Enrofloxacin	2 (14.3)	12 (85.7)
Gentamicin	0 (0)	14 (100)
Kanamycin	1 (7.1)	13 (92.9)
Nalidixic acid	3 (21.4)	11 (78.6)
Penicillin G	14 (100)	0 (0)
Rifampin	14 (100)	0 (0)
Sulfamethoxazole-trimethoprim	10 (71.4)	4 (28.6)
Tetracycline	10 (71.4)	4 (28.6)
Tigecycline	1 (7.1)	13 (92.9)

Preserving Antibiotics, Rationally

Aidan Hollis, Ph.D., and Ziana Ahmed, B.A.Sc.

N ENGL J MED 369:26 NEJM.ORG DECEMBER 26, 2013



Estimated Annual Antibiotic Use in the United States.

Data are shown as approximate numbers of kilograms of antibiotics used per year.

FIGHTING BACK AGAINST ANTIBIOTIC RESISTANCE



Four Core Actions to Prevent Antibiotic Resistance

1 PREVENTING INFECTIONS, PREVENTING THE SPREAD OF RESISTANCE



Avoiding infections in the first place reduces the amount of antibiotics that have to be used and reduces the likelihood that resistance will develop during therapy. There are many ways that drug-resistant infections can be prevented: immunization, safe food preparation, handwashing, and using antibiotics as directed and only when necessary. In addition, preventing infections also prevents the spread of resistant bacteria.

2 TRACKING



CDC gathers data on antibiotic-resistant infections, causes of infections and whether there are particular reasons (risk factors) that caused some people to get a resistant infection. With that information, experts can develop specific strategies to prevent those infections and prevent the resistant bacteria from spreading.

3 IMPROVING ANTIBIOTIC PRESCRIBING/STEWARDSHIP



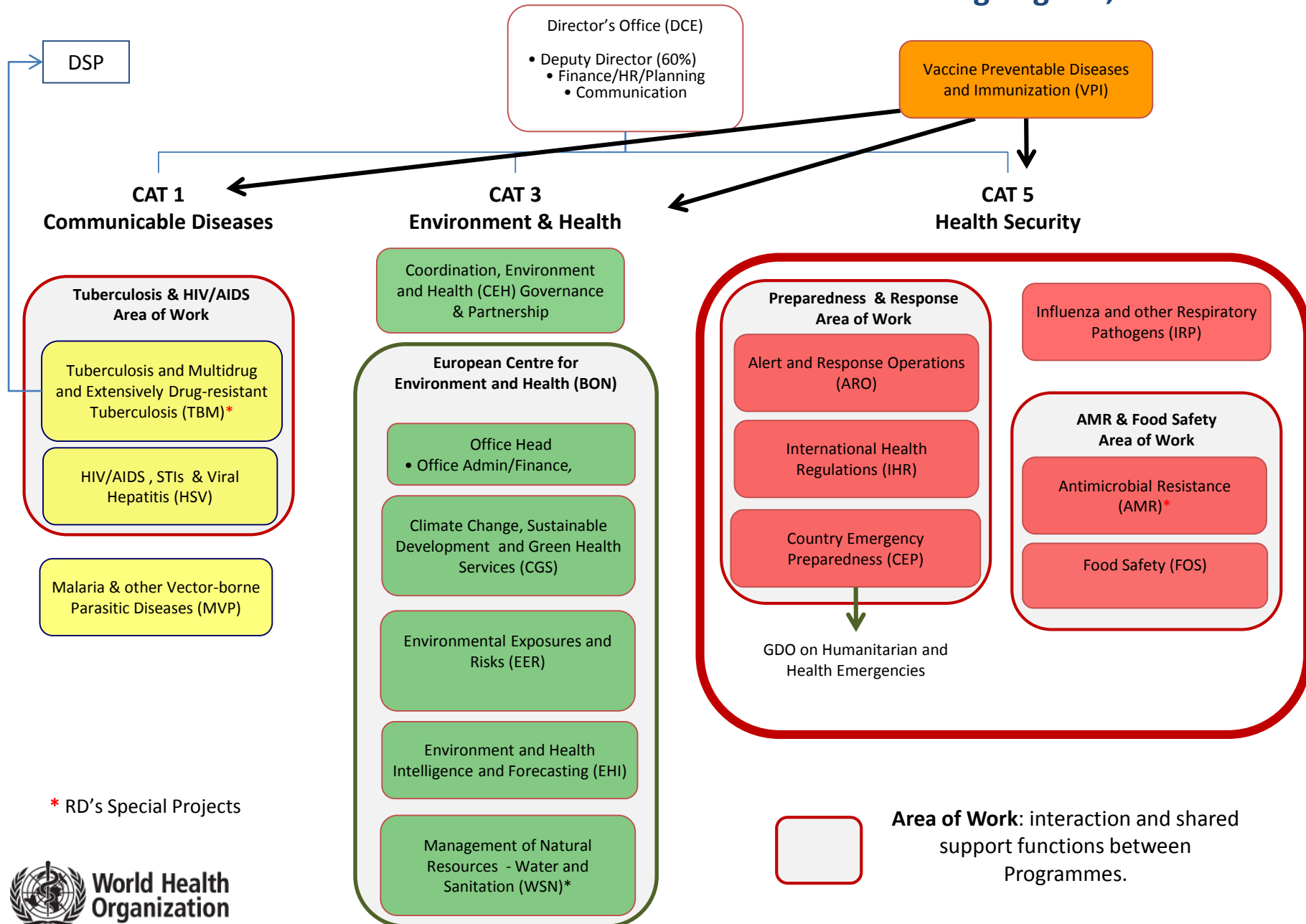
Perhaps the single most important action needed to greatly slow down the development and spread of antibiotic-resistant infections is to change the way antibiotics are used. Up to half of antibiotic use in humans and much of antibiotic use in animals is unnecessary and inappropriate and makes everyone less safe. Stopping even some of the inappropriate and unnecessary use of antibiotics in people and animals would help greatly in slowing down the spread of resistant bacteria. This commitment to always use antibiotics appropriately and safely—only when they are needed to treat disease, and to choose the right antibiotics and to administer them in the right way in every case—is known as antibiotic stewardship.

4 DEVELOPING NEW DRUGS AND DIAGNOSTIC TESTS

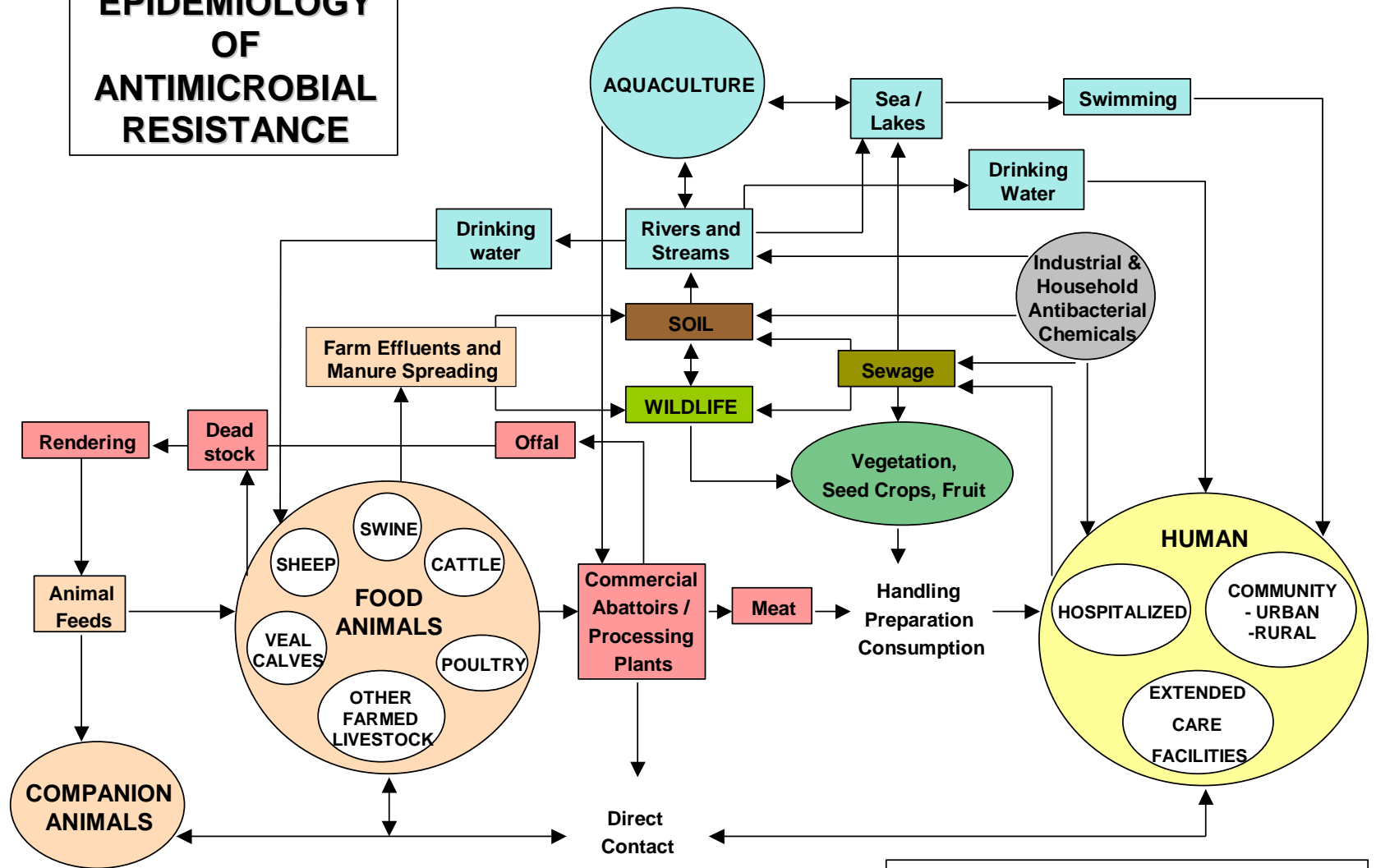


Because antibiotic resistance occurs as part of a natural process in which bacteria evolve, it can be slowed but not stopped. Therefore, we will always need new antibiotics to keep up with resistant bacteria as well as new diagnostic tests to track the development of resistance.

DCE Organigram, 2014



EPIDEMIOLOGY OF ANTIMICROBIAL RESISTANCE

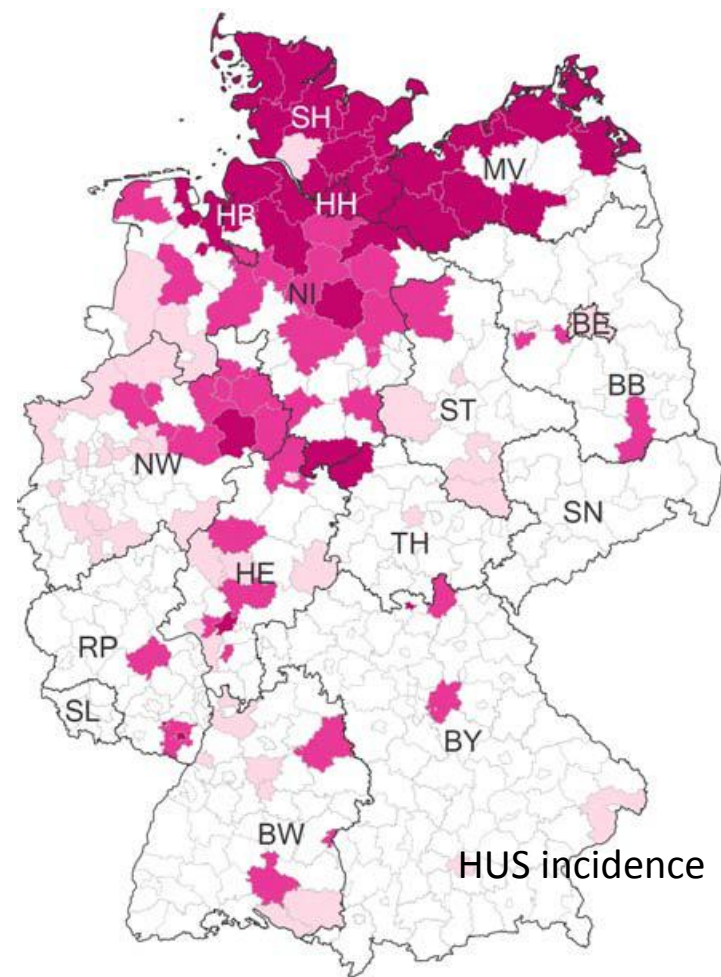
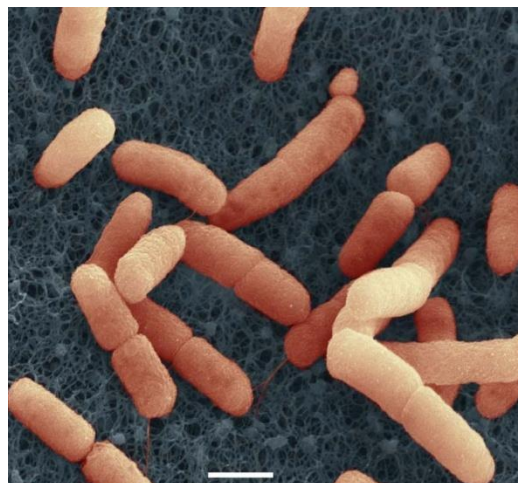


after Linton AH (1977), modified by Irwin RJ

Haemolytic-uremic syndrome (HUS) and gastroenteritis caused by enterohemorrhagic *Escherichia coli* (EHEC) serotype O104:H4, Germany (and France), May-July 2011.

- 855 cases of HUS
- 2,987 cases of acute gastroenteritis
- Sprouts as the vehicle of infection

EHEC bacteria of the outbreak strain O104:H4. Scanning electron microscope.
Scale: 1 μ m
Source: Holland, Laue (Robert Koch Institute)



Source: Final report EHEC O104:H4 outbreak, Germany 2011.

Food safety capacity building

Focus on **Central Asia** and the **Balkans**

- ➔ Integrated intersectoral food safety systems
whole-food-chain approach
- ➔ **Surveillance of foodborne diseases**
- ➔ Monitoring of food safety hazards in the food chain
- ➔ Food safety risk communication
- ➔ Hazard Analysis and Critical Control Points (HACCP) Systems in the food chain
- ➔ Antibiotic resistance in a food safety perspective



European strategic action plan on antibiotic resistance 2011–2016

 **World Health Organization**
REGIONAL OFFICE FOR Europe

EUR/RC61/R6
15 September 2011
112662
ORIGINAL: ENGLISH

Regional Committee for Europe
Sixty-first session
Baku, Azerbaijan, 12–15 September 2011

Resolution European strategic action plan on antibiotic resistance

The Regional Committee,

Recalling World Health Assembly resolutions WHA51.17 on Emerging communicable diseases: antimicrobial resistance, WHA58.27 on Improving the control of antimicrobial resistance and WHA62.15 on Prevention and control of multidrug-resistant tuberculosis;

Acknowledging Member States' existing commitments and the WHO Global Strategy for Containment of Antimicrobial Resistance, and the forces and informal networks at global and regional levels are addressing the challenges posed by antimicrobial resistance (national use of antimicrobials, etc.);

Concerned by the increasing emergence of resistant strains of bacteria, and the resort to antibiotics such as carbapenems, and other last-resort antibiotics;

Further concerned that the demand for antibiotics in health care is more than 25 000 people per year, and that the health care and societal costs;

Taking into consideration the fact that antibiotic resistance and antimicrobial resistance are closely linked and that containment of antibiotic use calls for an integrated approach;

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 **World Health Organization**
REGIONAL OFFICE FOR Europe

EUR/RC61/R6
15 September 2011
112662
ORIGINAL: ENGLISH

Eighteenth Standing Committee
of the Regional Committee for Europe
Fourth session
WHO headquarters, Geneva, 14–15 May 2011
Provisional agenda item 5

Strategic action plan on antibiotic resistance

The use, but especially the overuse, misuse and underuse, of antimicrobial agents often leads to the adaptation of microorganisms through mutations, genetic recombination and selection, so that resistant strains may become the predominant organisms in the community. Health care settings or the environment. In the WHO European Region, the development of antibiotic resistance is also complicating the treatment of a large range of common infections in the community, such as respiratory and urinary tract infections, sexually transmitted infections and other infections. In some countries, the use of antibiotics in the veterinary, food animal production and agriculture sectors, which can easily spread between people, animals, products and the environment.

In 29 countries of the Region, an estimated 25 000 people die every year because of infections related to antibiotic resistance, most of them contracted in health care settings. They give rise to considerable health costs as a result of longer hospital stays and more expensive treatment, as well as direct and indirect costs to society. However, the use of antibiotics in the veterinary, food animal production and agriculture sectors, which can easily spread between people, animals, products and the environment.

Although microbial resistance to other antimicrobial agents such as antiparasitic and antifungal drugs is occurring and is important, the focus on antibiotic resistance in the European Region is justified by its extensive impact on public health and the increasing number of last-resort antibiotics used to treat life-threatening infections in health care settings, a situation that may soon lead to potentially untreatable infections.

A number of key strategic actions are proposed to integrate, prevent and control antibiotic resistance. These include promoting national coordination to implement national strategies; plans of action and develop regulatory functions; and guidance systems to monitor the use of antibiotics across many sectors; strengthening surveillance of the prudent use of antibiotics and resistant bacteria; and creating awareness of the prudent use of antibiotics and the fact that new antibiotic drugs are not coming onto the market soon.

The resistance developed by mycobacteria, such as is seen in multidrug- and extensively drug-resistant tuberculosis (MDR-TB), is presented in a separate strategy paper, using similar concepts integrated within the tuberculosis control programme.

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AFTER
SURGERY

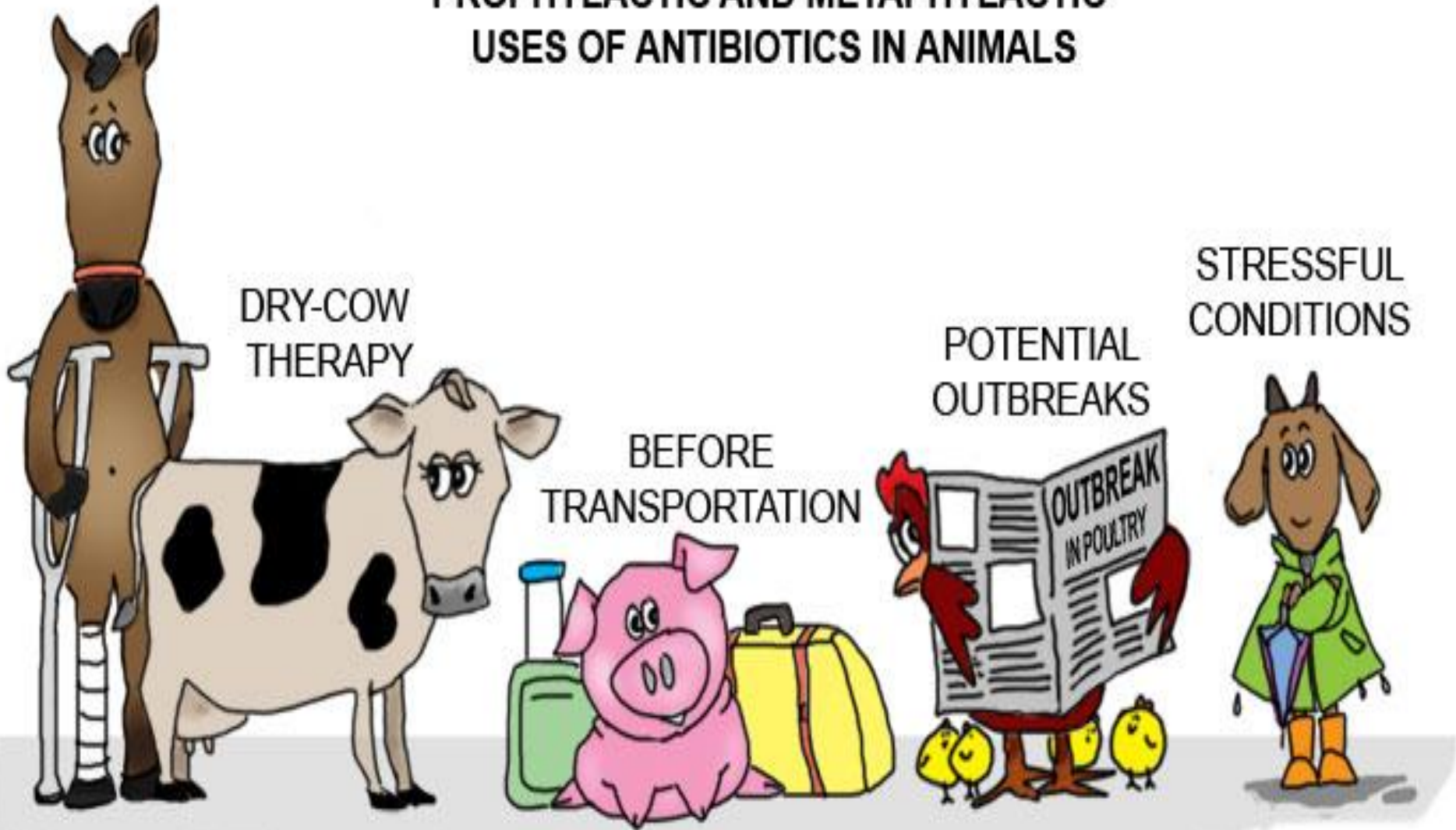
SOME EXAMPLES OF PROPHYLACTIC AND METAPHYLACTIC USES OF ANTIBIOTICS IN ANIMALS

DRY-COW
THERAPY

BEFORE
TRANSPORTATION

POTENTIAL
OUTBREAKS

STRESSFUL
CONDITIONS



1. Antibiotic resistance in relation to food safety

Antibiotic use in food production

Why antibiotics are used

Following the dramatic breakthrough in the control of bacterial infections in people after the introduction of antibiotics in the early 1940s, these drugs were introduced in veterinary medicine in the 1950s. Antibiotics are used in animals for therapy, disease prevention (prophylaxis) and growth promotion. The same classes of antibiotics are used in animals as those used medicinally in people. Due to the large numbers of animals and the industrialized production of food animals, the quantity of antibiotics used in food production in many countries seems to exceed the amounts used medicinally in people.

Veterinarian using antibiotic in treatment

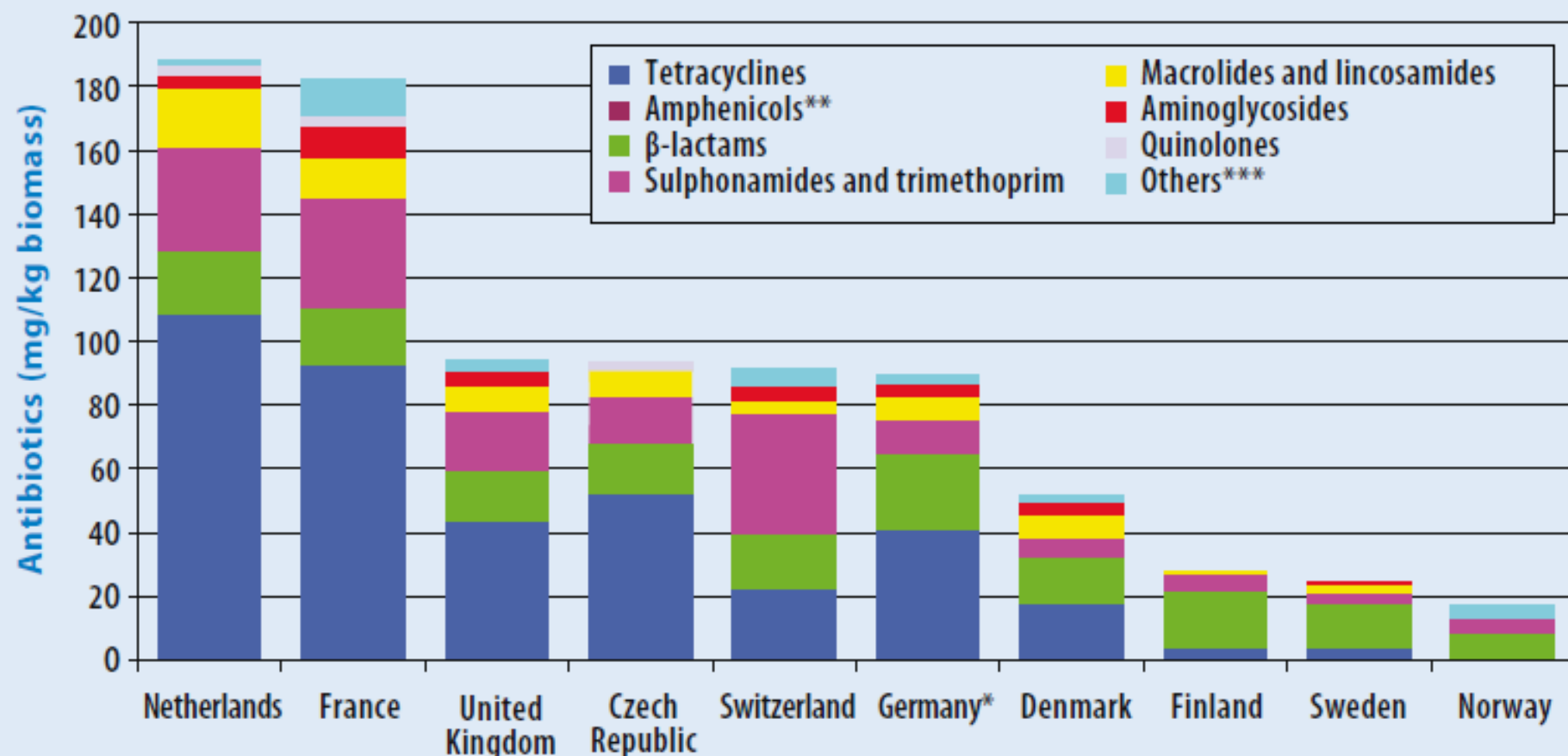


© Gettyimages

Uso de antibióticos em animais:

- Tratamento de doenças respiratórias
- Tratamento de doenças entéricas
- Uso em neonatos (porcos, bezerros, pintos...)
- Uso em mastites e outras infecções
- Uso em aquacultura
- Uso de subdoses como promotor de crescimento

Fig. 3. Amounts of veterinary antibiotics sold in 2007 per kg biomass of pig meat, poultry meat and cattle meat produced, plus estimated live weight of dairy cattle



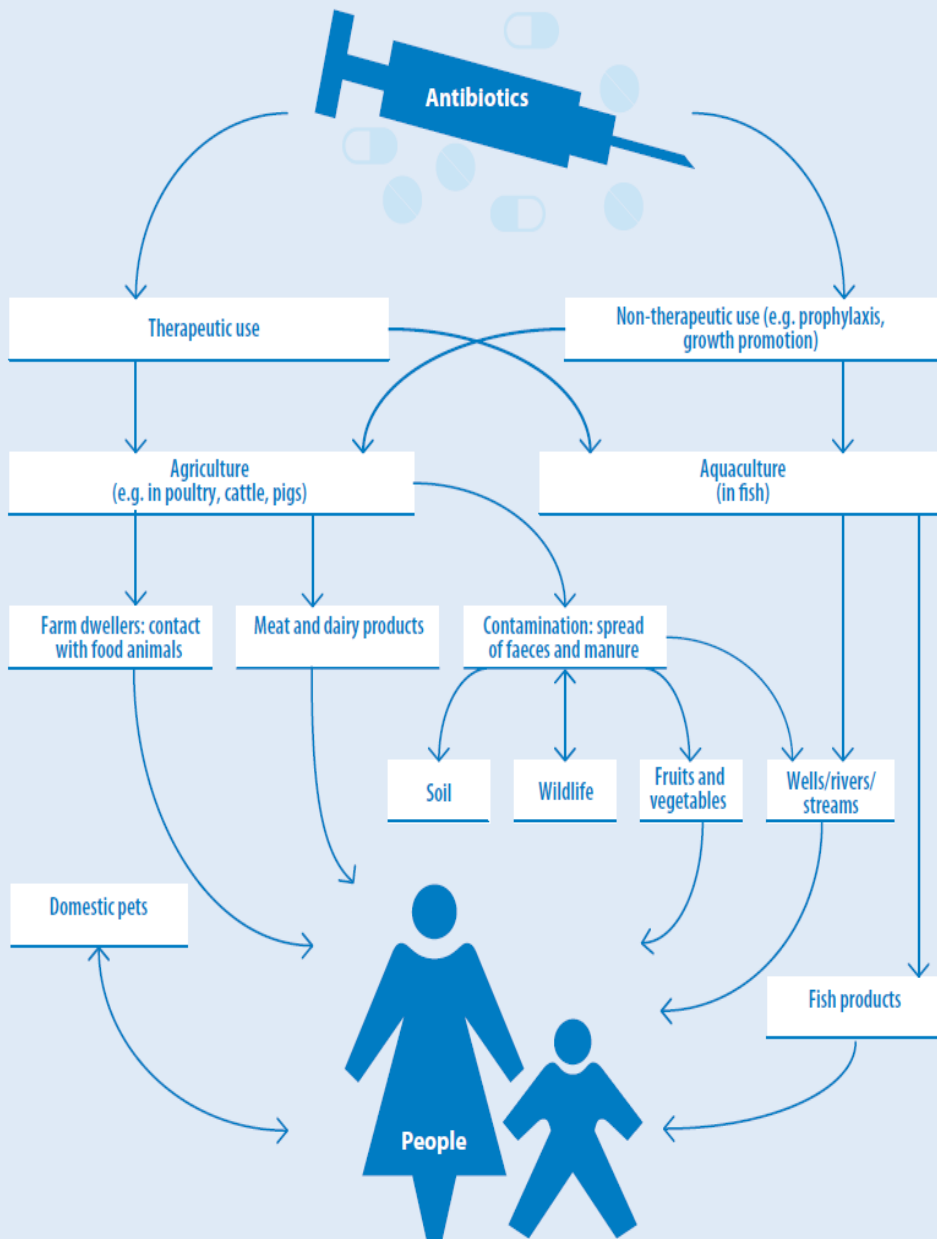
* 2005 data.

** Amounts are so small as to be invisible in this figure.

*** The substances included in this category vary between countries.

Source: Grave, Torren-Edo & Mackay (19).

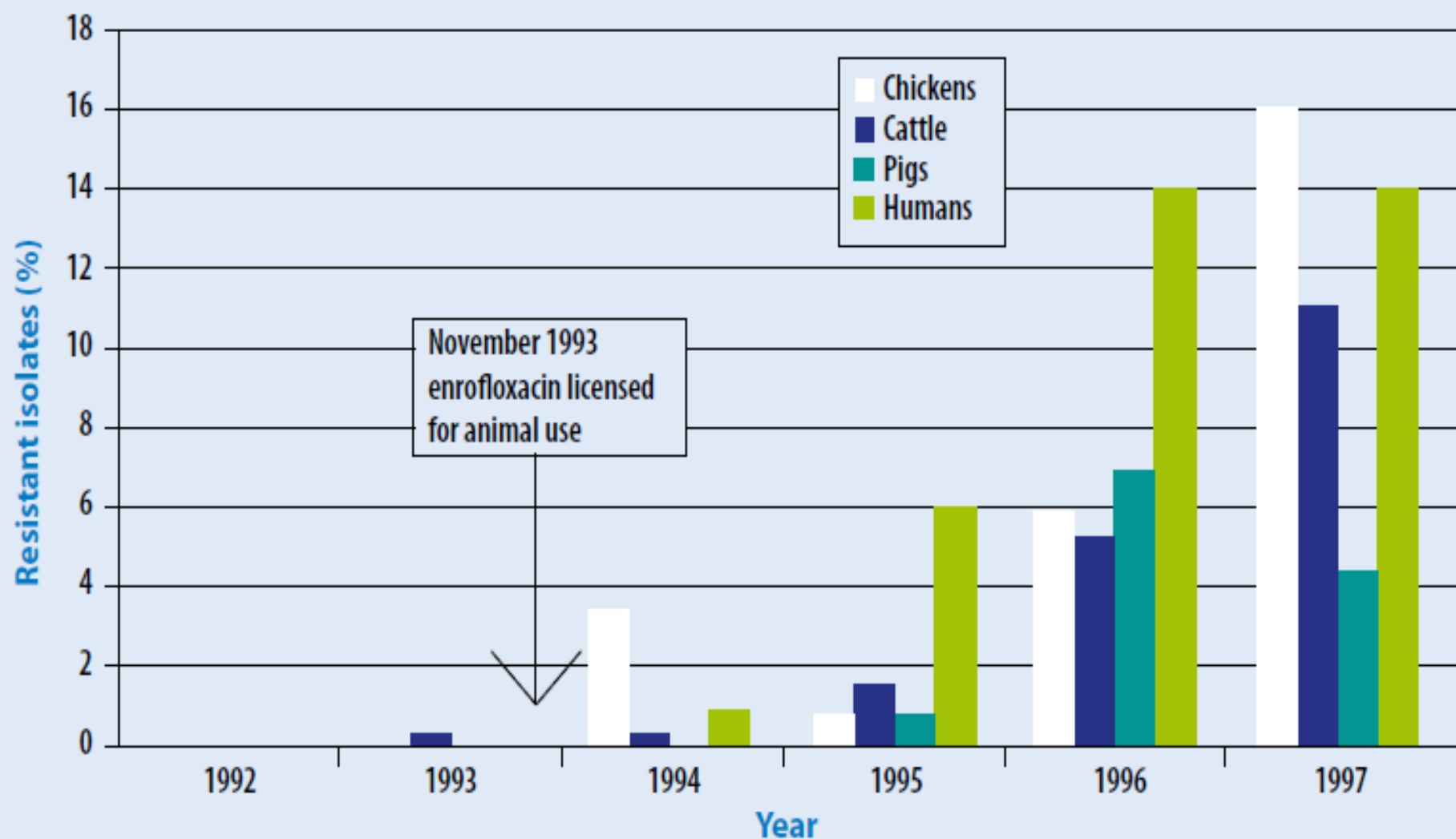
Fig. 4. The flow of antibiotic-resistant bacteria



Antibióticos e MDRs:

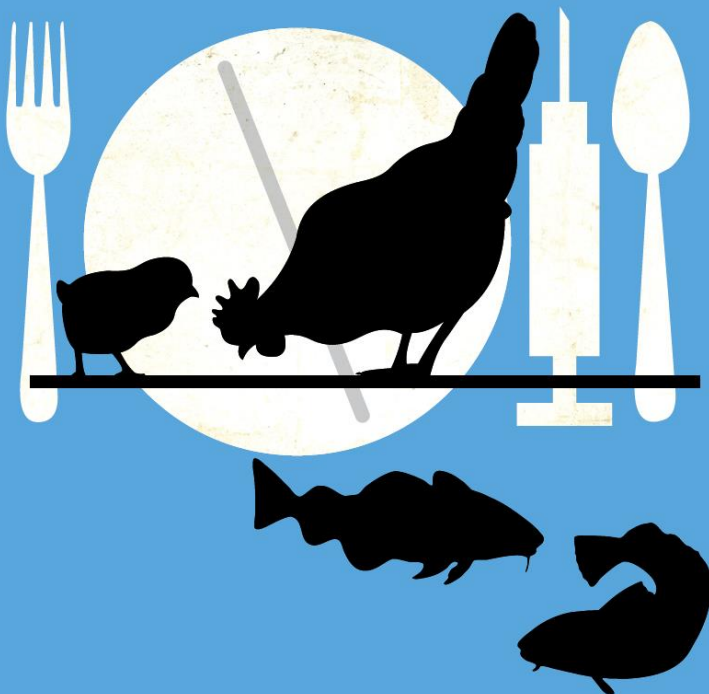
- VRE: resistência cruzada de vancomicina e avoparcina
- *Campylobacter* resistente a quinolona
- *Salmonella typhimurium* resistente a quinolona e cefalosporinas
- *Salmonella* ESBL e AmpC

Fig. 5. Quinolone-resistant multiresistant *S. Typhimurium* DT104, United Kingdom, 1992–1997



Source: European Centre for Disease Prevention and Control et al. (21).

Tackling antibiotic resistance from a food safety perspective in Europe



Regulation

- ❖ **Eliminar** ATB como fator de crescimento
- ❖ **Restringir** a prescrição apenas para veterinários de profiláticos e metafiláticos
- ❖ **Justificar o uso de ATM** importantes para tratamento humano como : quinolonas, cefalosposrinas de 3ª e 4ª.

Reduced need for and prudent use of antibiotics in animal husbandry

Estratégias de Controle:

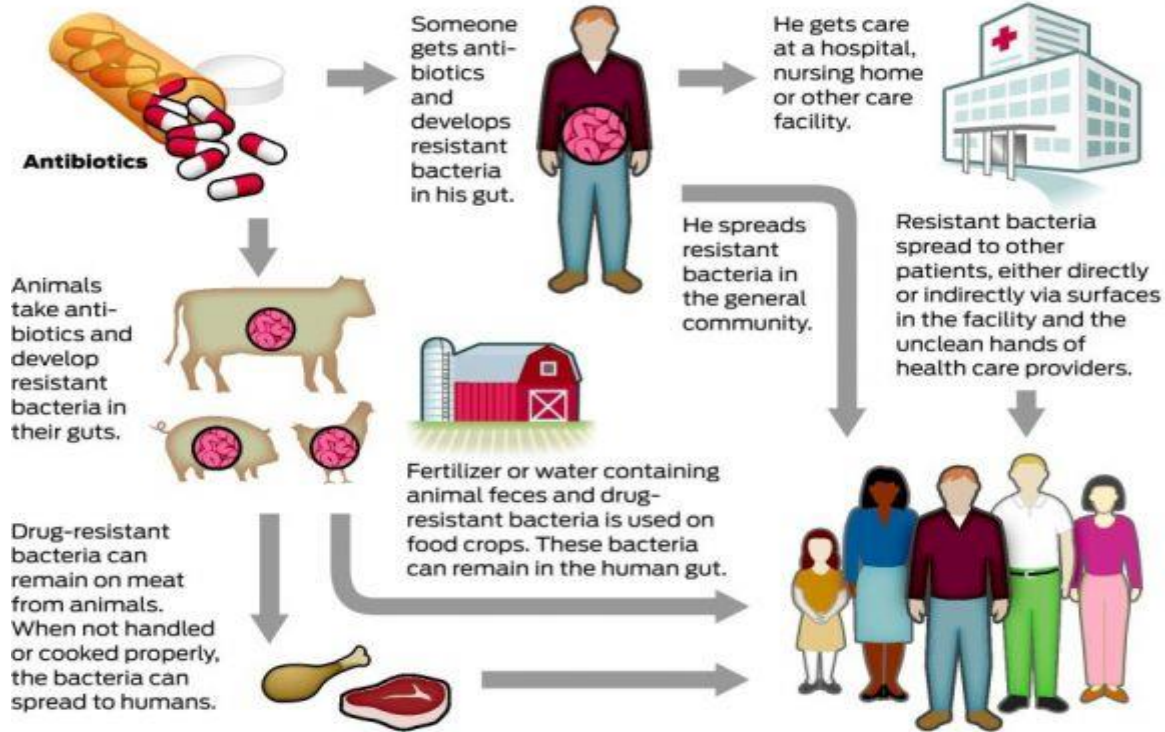
- ❖ Reduzir o uso na agricultura introduzindo medidas preventivas como vacinas, higiene, biossegurança e boas práticas.
- ❖ Eliminar incentivos econômicos que estimulam a prescrição inadequada.

GET SMART



**Know When Antibiotics
Work On The Farm**

How antibiotic resistance spreads





World Health Organization

REGIONAL OFFICE FOR **Europe**



Agradecimentos:

- WHO DCE -

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- ❖ Mohamad Ibrahim
 - ❖ Zsofia Bogнар
 - ❖ Charles Elikwu



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INFECTO 2015

Gramado 26 a 29 de agosto

www.infecto2015.com.br

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Gerenciamento:

