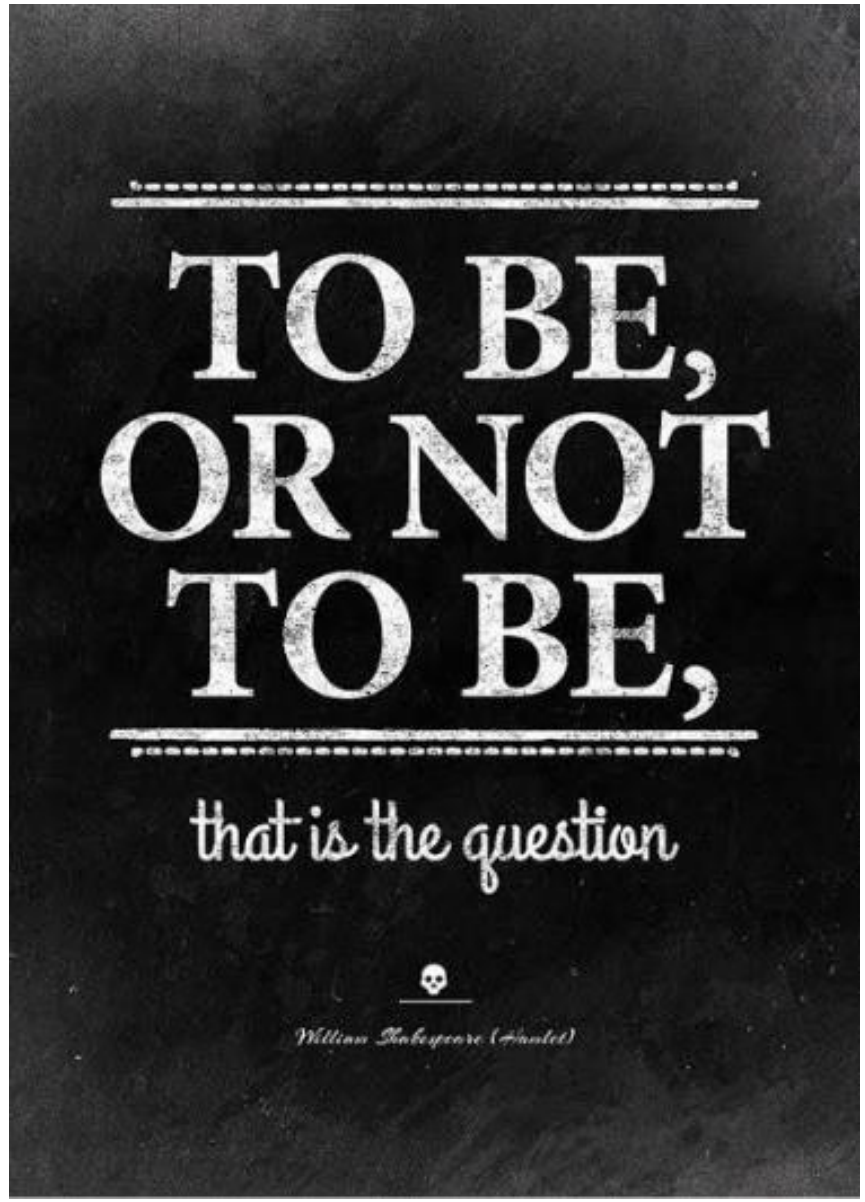
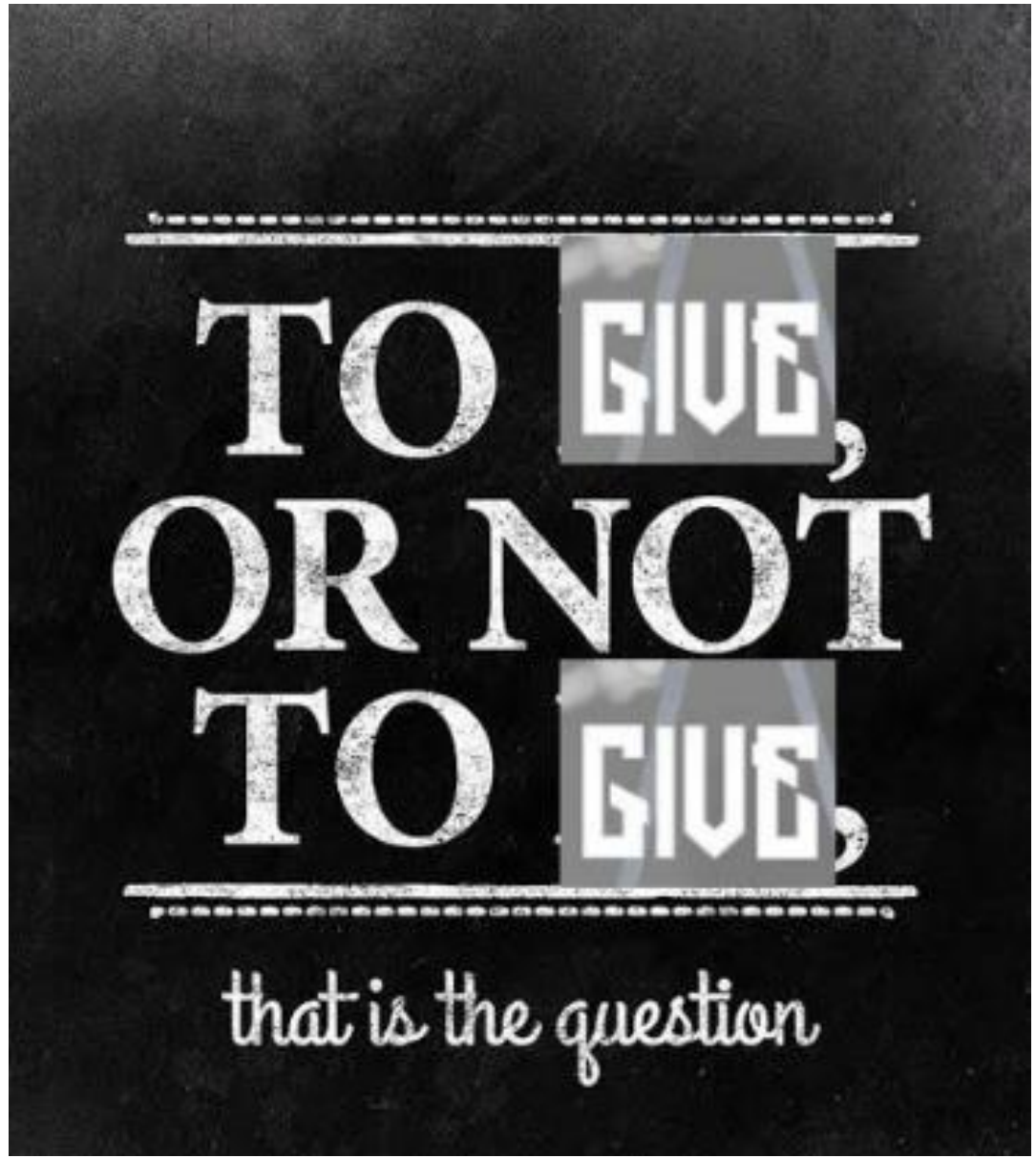

Tek Sağlık
Antimikrobiyal Direnç
Prof. Dr. Elif Aktaş Sepetci
Sağlık Bilimleri Üniversitesi
Şişli Hamidiye Effal EAH
Tıbbi Mikrobiyoloji Laboratuarı


00:00:03
AMR ile mücadele edilmezse
2050'de her 3 saniyede 1 insan ölecek


GLASS
Global AMR
Surveillance System


HANDLE
ANTIBIOTICS
WITH CARE
World Health
Organization


TO BE,
OR NOT
TO BE,
that is the question
William Shakespeare (Hamlet)

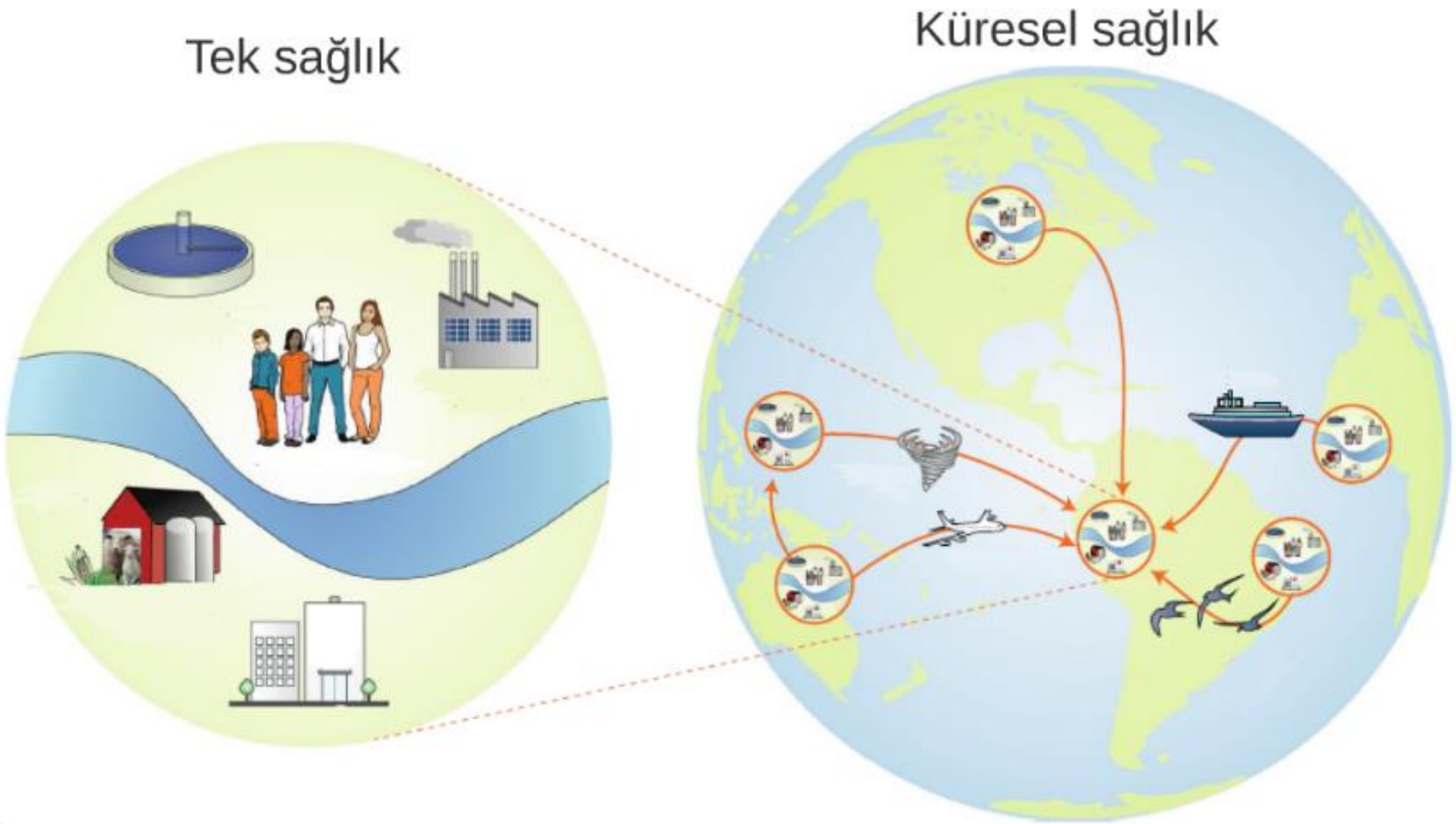

TO GIVE,
OR NOT
TO GIVE,
that is the question

Gereksiz antibiyotik kullanımı
Uzamış profilaksi
Uzamış tedavi
Uygun olmayan antibiyotik/
antibiyotik kombinasyonları

El hijyeni

Tek sağlık

PERSPECTIVE
https://doi.org/10.1038/s41564-019-0503-9
nature microbiology



PERSPECTIVE
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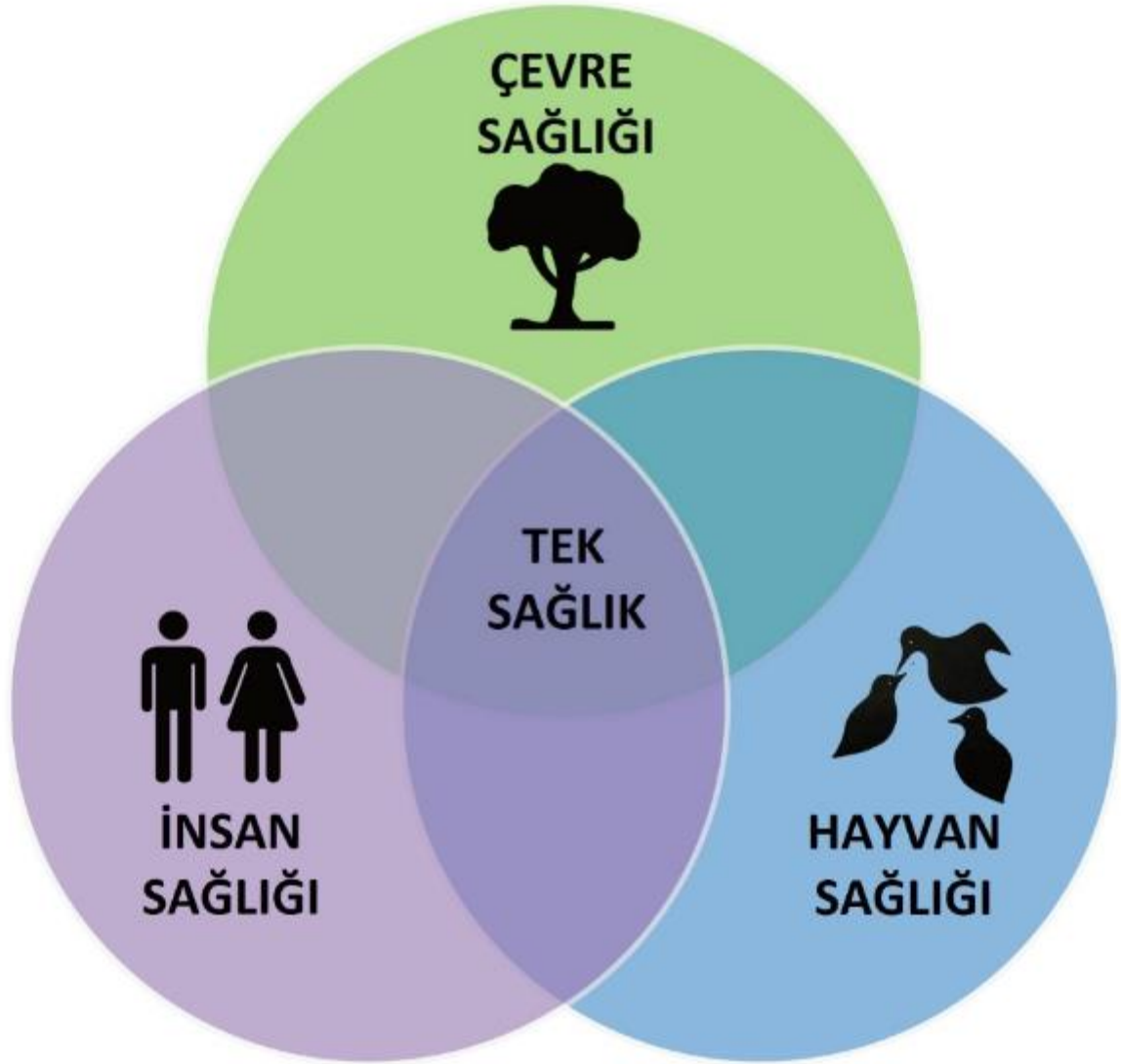
nature microbiology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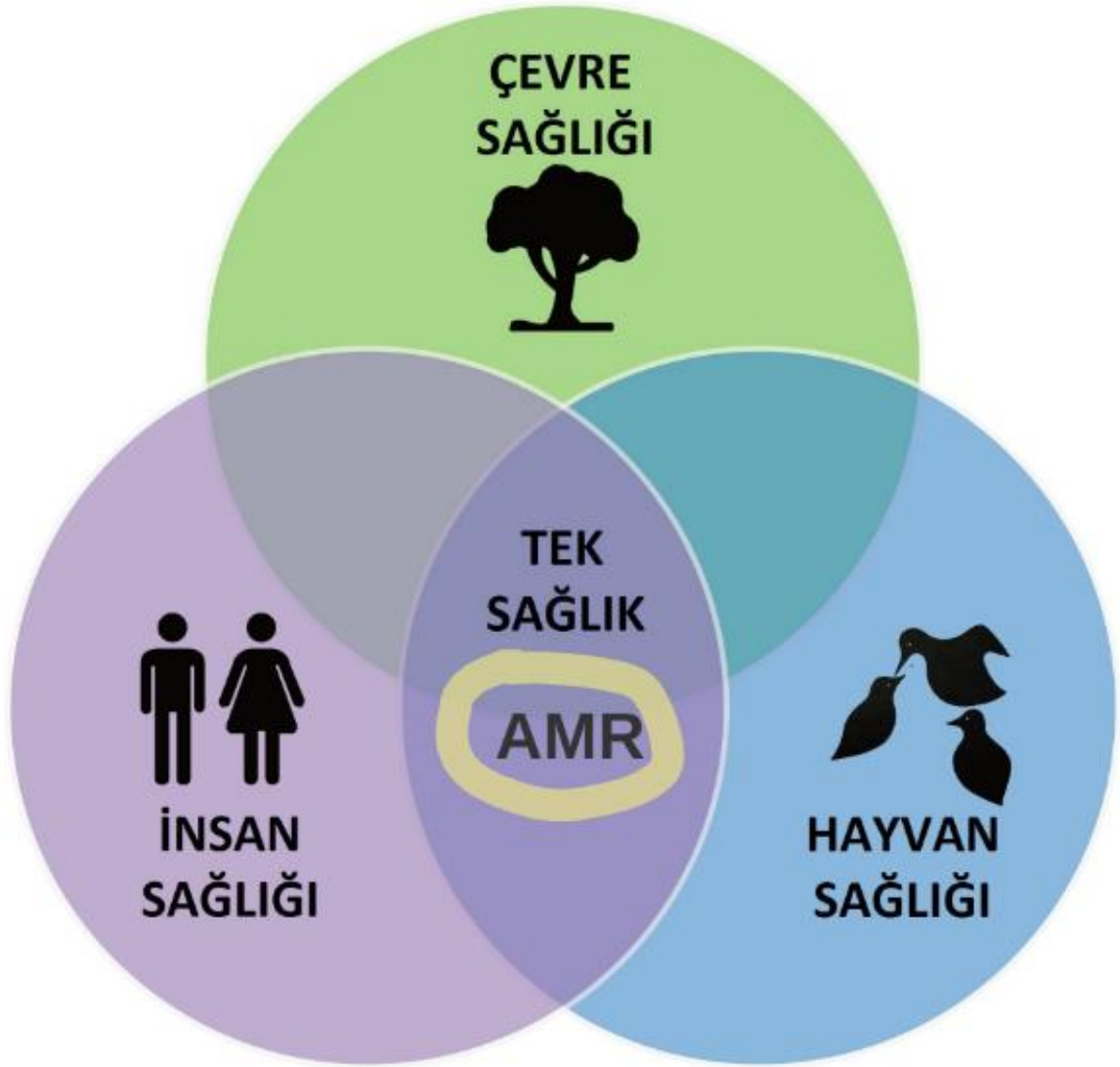
ÇEVRE
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TEK
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AMR
İNSAN
SAĞLIĞI
HAYVAN
SAĞLIĞI

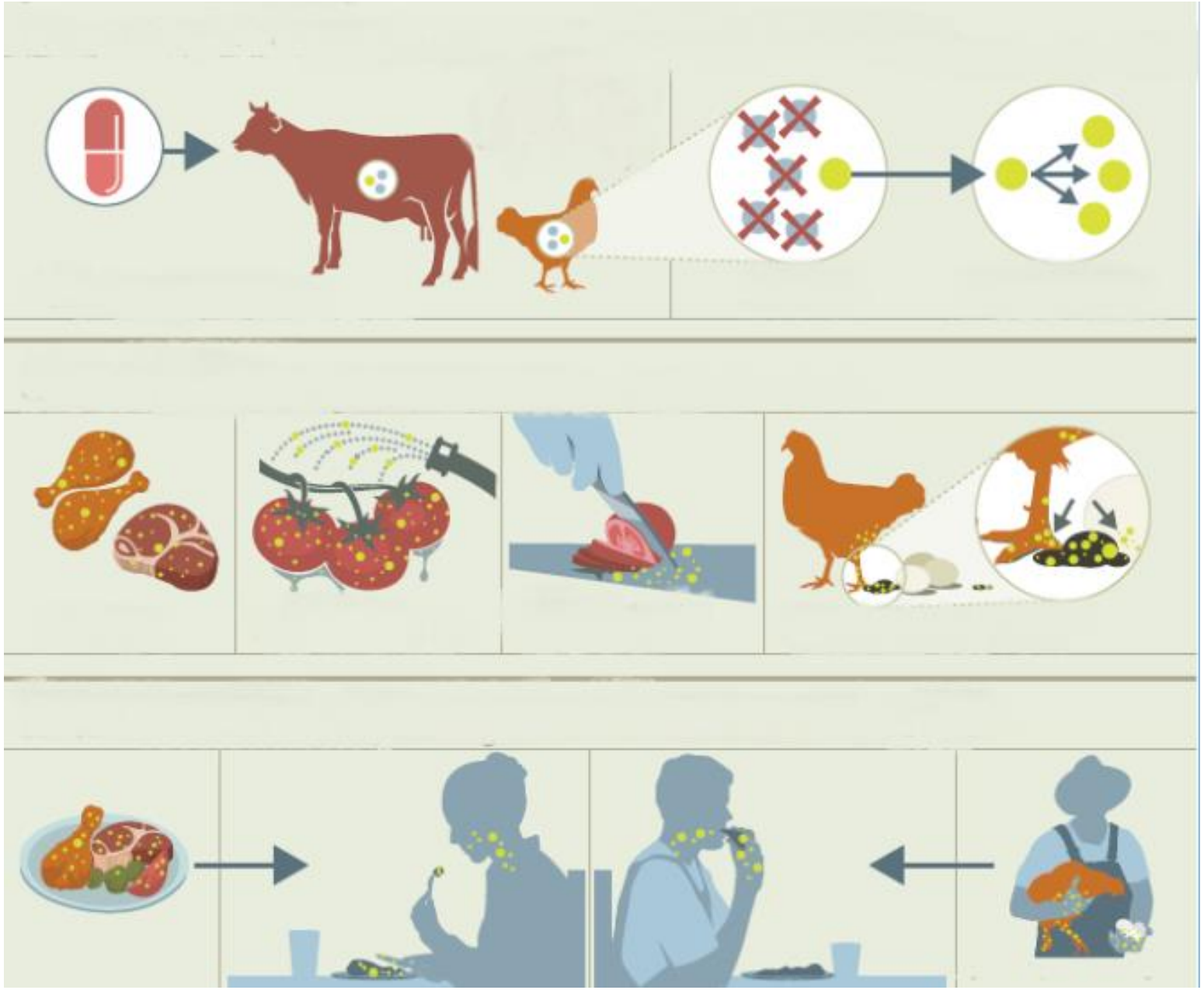
PERSPECTIVE
https://doi.org/10.1038/s41564-019-0503-9
nature microbiology

60%

Zoonozların mevcut insan enfeksiyonları içerisindeki oranı

5

Her yıl ortaya çıkan yeni insan hastalığı sayısı; 3'ü hayvan kökenli



Neden antibiyotik?

Tedavi

Profilaksi

Metafilaksi

Büyümeyi arttırıcı etki

Neden antibiyotik?

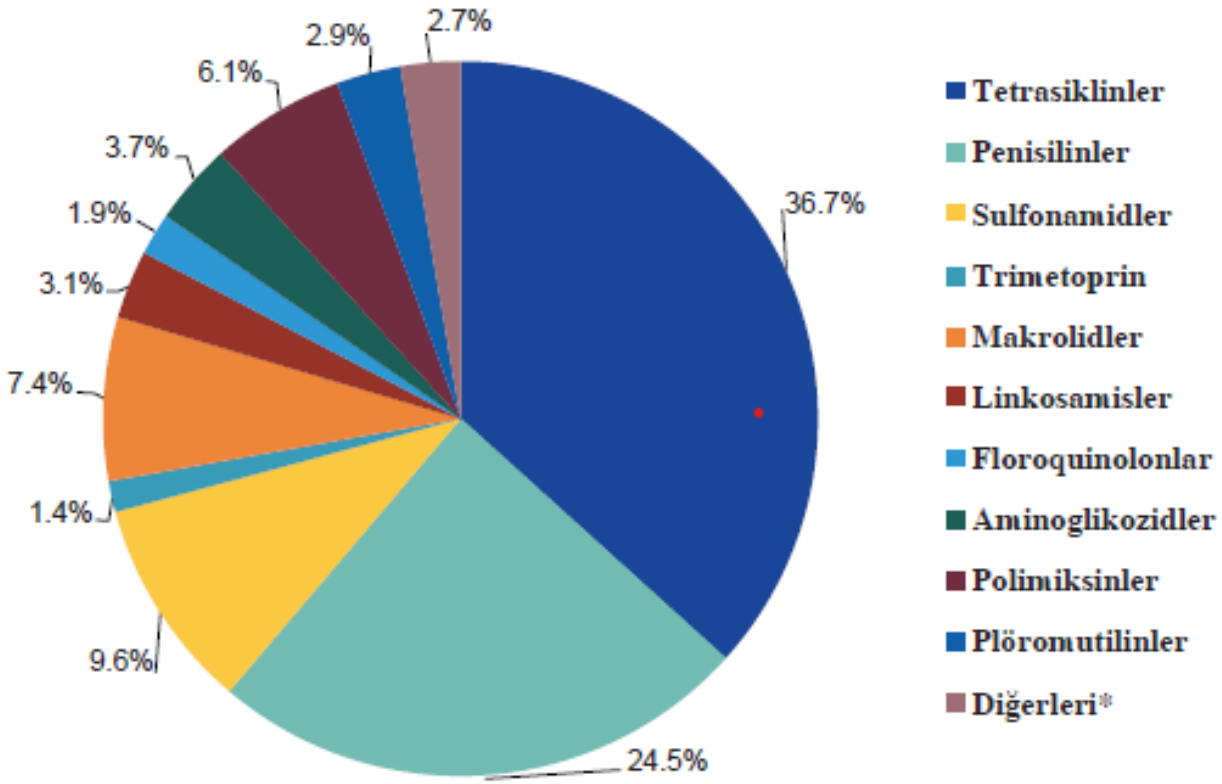
Tedavi

Profilaksi

Metafilaksi

Büyümeyi arttırıcı etki

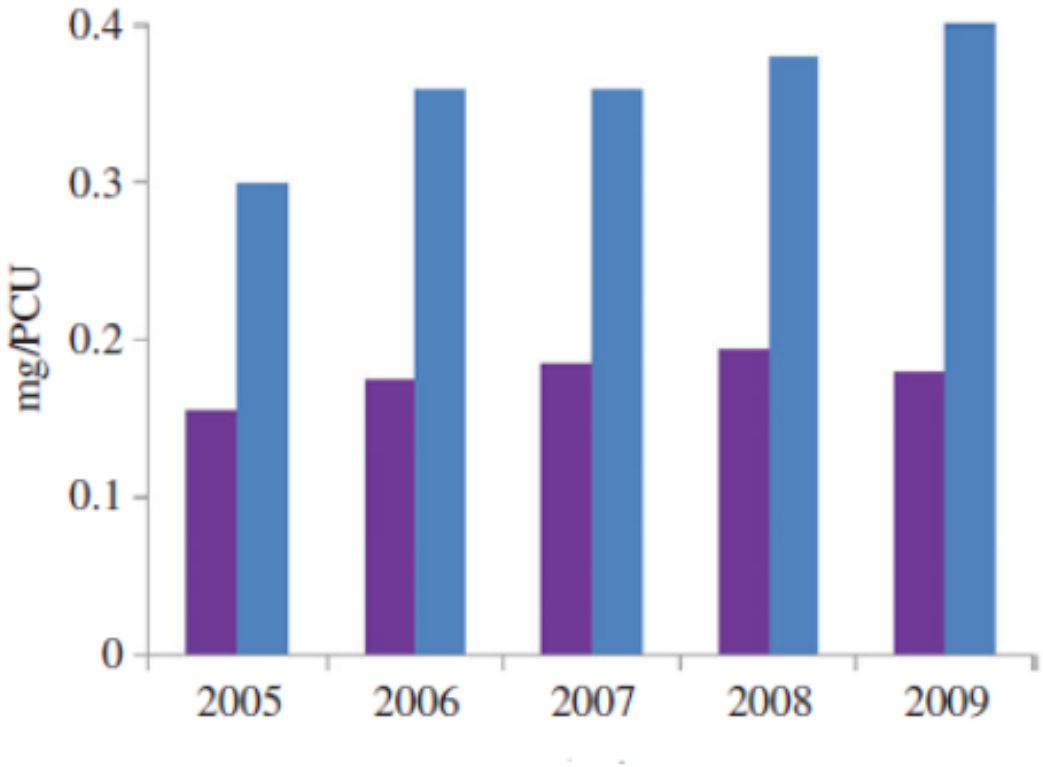
Hangi antibiyotikler?



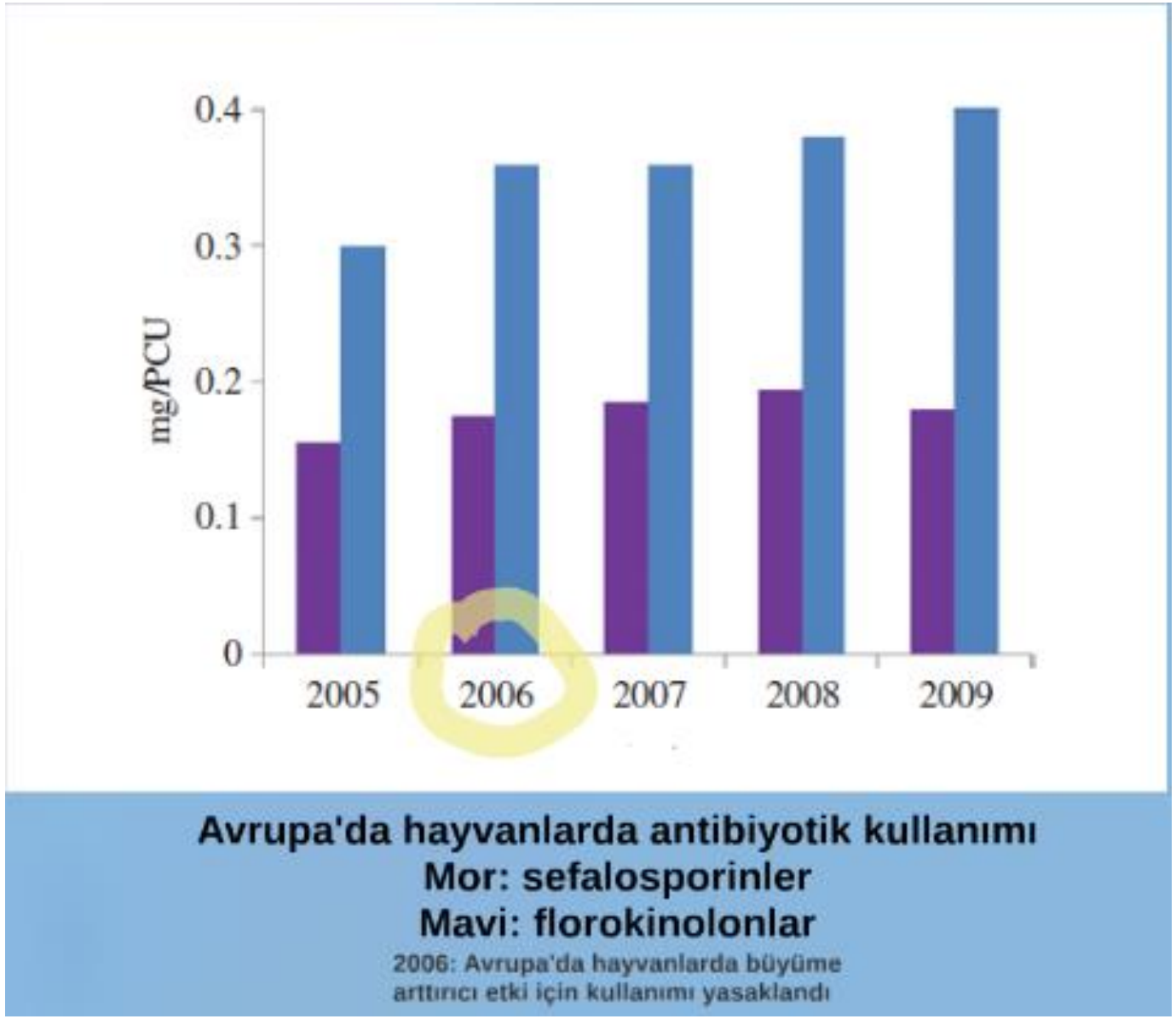
Şekil 10. *Avrupa Birliği ülkelerinde hayvan sağlığında kullanılan antibiyotikler*

Ne kadar antibiyotik?

Source: Animal consumption figure of 8,893,303kg from FDA, 2012. Human consumption of 3,379,226kg in 2012 based on calculations by IMS Health.
The figures are rounded from 72.5% used in animals and 27.5% used in humans.

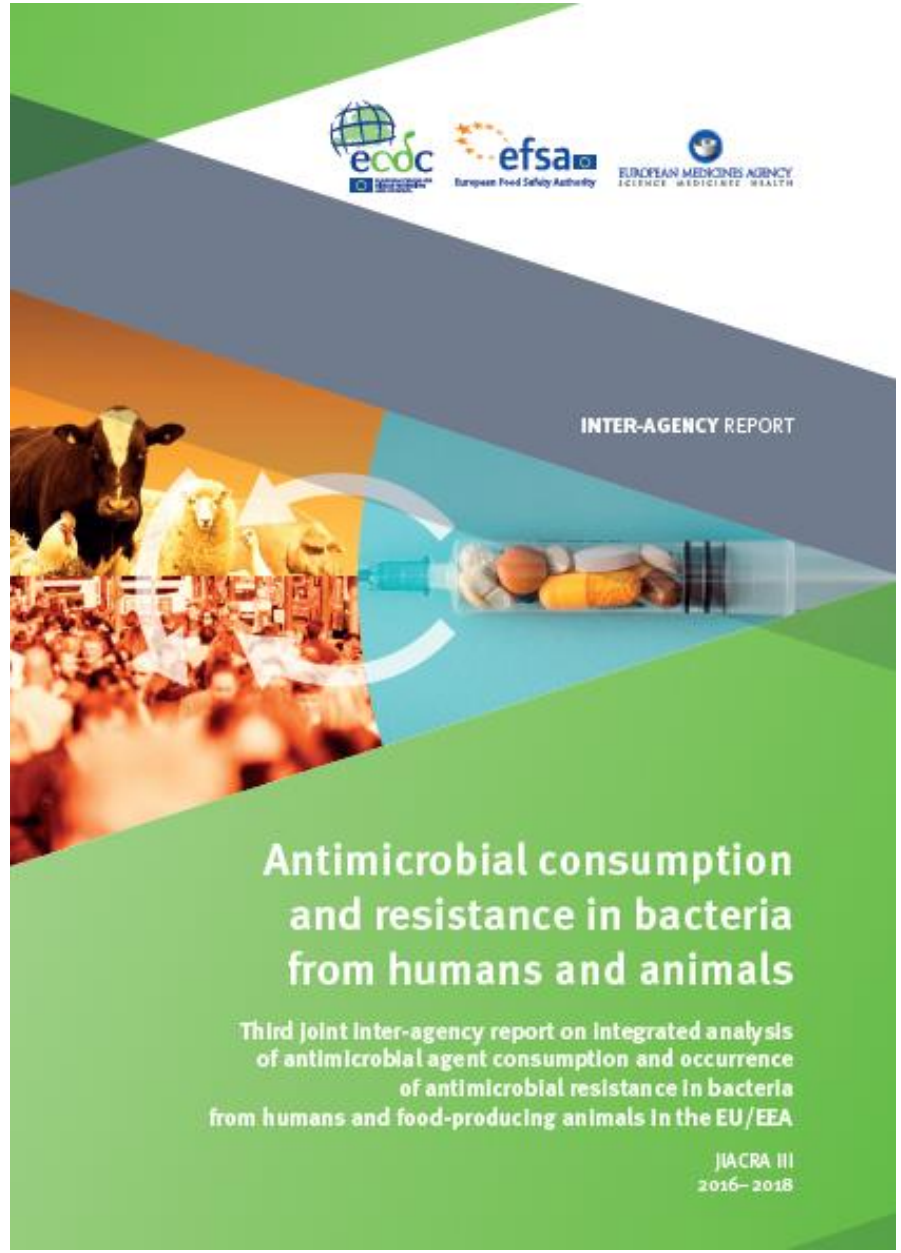


Avrupa'da hayvanlarda antibiyotik kullanımı
Mor: sefalosporinler
Mavi: florokinolonlar



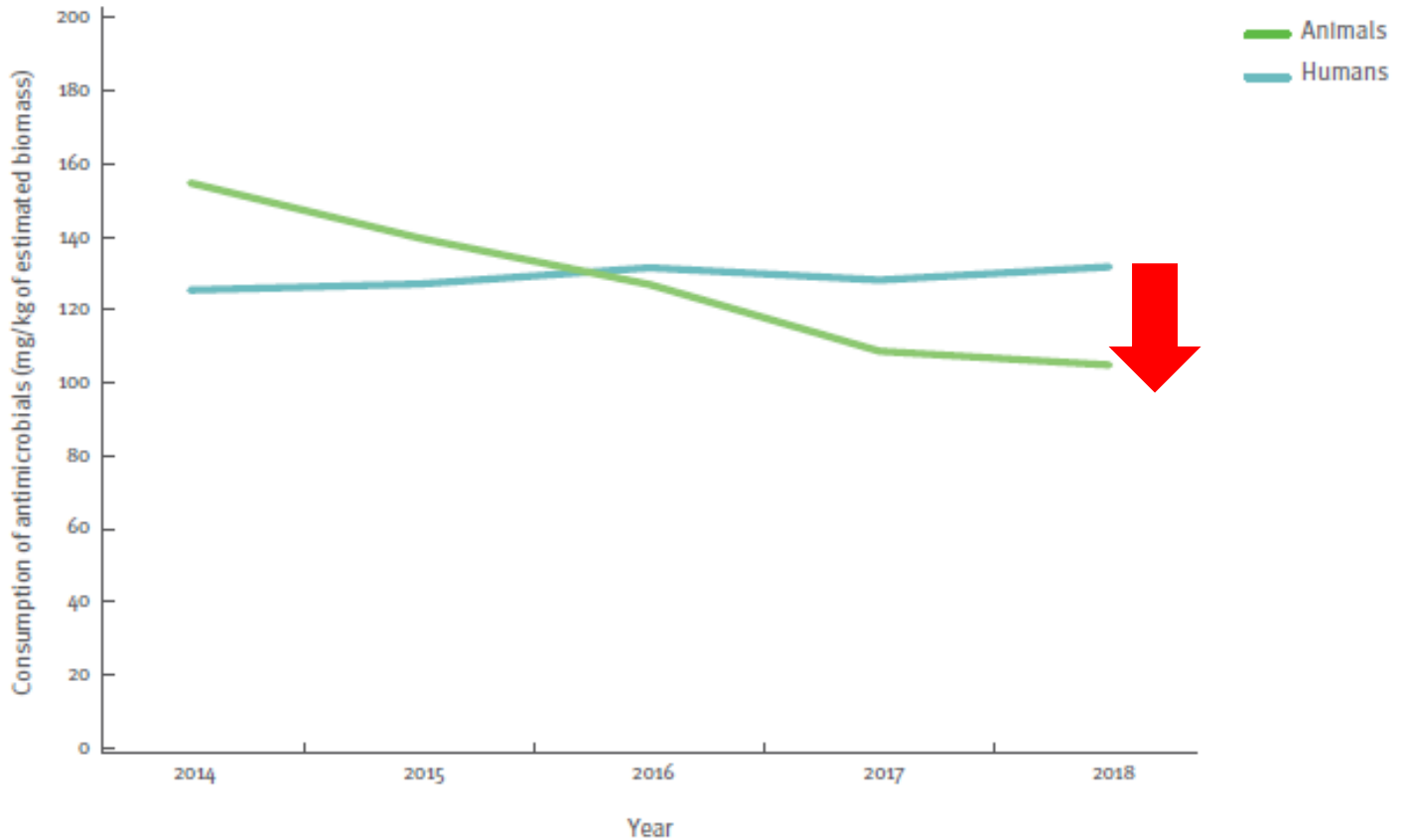
Avrupa'da hayvanlarda antibiyotik kullanımı
Mor: sefalosporinler
Mavi: florokinolonlar

2006: Avrupa'da hayvanlarda büyüme arttırıcı etki için kullanımı yasaklandı


ecdc
efsa
European Food Safety Authority
EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH
INTER-AGENCY REPORT
Antimicrobial consumption and resistance in bacteria from humans and animals
Third joint inter-agency report on integrated analysis of antimicrobial agent consumption and occurrence of antimicrobial resistance in bacteria from humans and food-producing animals in the EU/EEA
JIACRA III
2016–2018

JIACRA 2021

Figure III: Population-weighted mean of the total consumption of antimicrobials in humans[a] and food-producing animals[b] in 27 EU/EEA countries[c] for which data were available for both humans and food-producing animals, for 2014–2018



(a) For humans: ATC J01 Antibacterials for systemic use.

(b) For food-producing animals: ATCvet QA07AA, QA07AB, QG01AA, QG01AE, QG01BA, QG01BE, QG51AA, QG51AG, QJ01, QJ51, QP51AG

(c) AT, BE, BG, CY, DE, DK, EE, ES, FI, FR, HR, HU, IE, IS, IT, LT, LU, LV, NL, NO, PL, PT, RO, SE, SI, SK, UK.

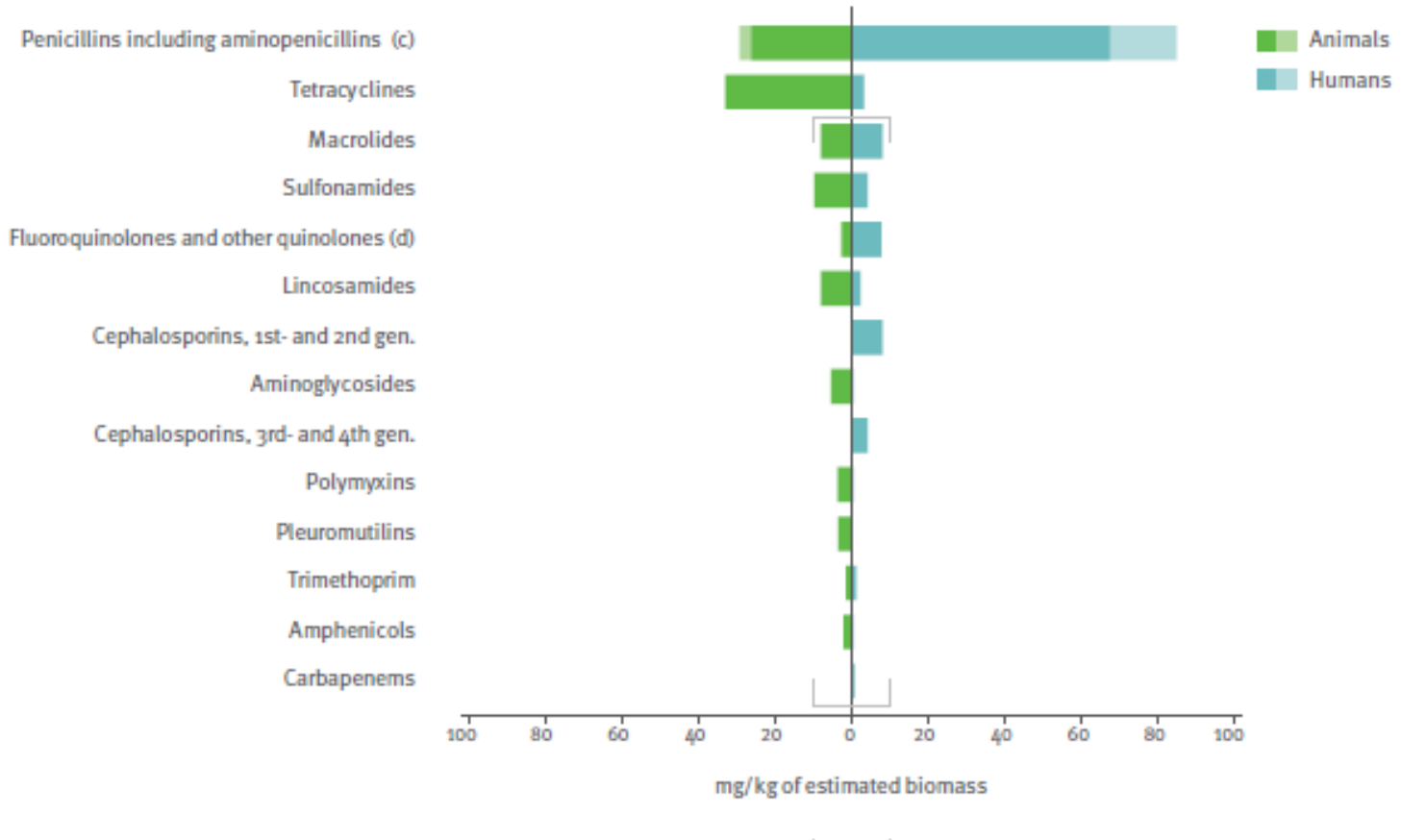
JIACRA 2021

Table 6: Amount of antimicrobial active substance[a], estimated biomass and antimicrobial consumption in humans and food-producing animals[a], 29 EU/EEA countries for which data were available both for humans and food-producing animals, 2017

Country	Hospital consumption data included	Amount of active antimicrobial substance (tonnes)			Estimated biomass (1,000 tonnes)			Antimicrobial consumption (mg/kg estimated biomass)	
		Humans[b]	Food-producing animals[c]	Total	Humans	Food-producing animals	Total	Humans	Food-producing animals
Austria	No	41	45	85	548	954	1502	74.4	46.8
Belgium	Yes	104	221	325	709	1683	2393	146.3	131.3
Bulgaria	Yes	52	50	101	444	375	819	116.7	132.3
Croatia	Yes	33	21	54	260	296	555	122.8	71.5
Cyprus	Yes	8	45	54	53	107	161	153.1	423.1
Denmark	Yes	49	94	143	359	2398	2757	135.3	39.4
Estonia	Yes	6	6	12	82	111	193	73.2	56.7
Finland	Yes	41	10	51	344	507	851	118.8	19.3
France	Yes	762	483	1244	4175	7039	11214	181.6	68.6
Germany[d]	No	339	767	1106	5158	8609	13766	63.8	89.0
Greece	Yes	143	117	260	673	1243	1916	212.6	93.9
Hungary	Yes	51	147	199	612	771	1383	84.0	191.0
Iceland	No	2	1	3	21	125	146	111.4	4.6
Ireland	Yes	44	98	143	299	2114	2413	148.8	46.6
Italy	Yes	560	1058	1618	3787	3864	7651	147.9	273.8
Latvia	Yes	11	6	17	122	176	298	88.6	33.3
Lithuania	Yes	19	12	31	178	333	511	107.3	34.8
Luxembourg[d]	Yes	6	2	8	37	55	92	158.4	35.0
Malta	Yes	4	2	6	29	15	43	140.6	121.0
Netherlands[c]	Yes	58	188	246	1068	3341	4408	52.8	56.3
Norway	Yes	45	6	50	329	1861	2190	136.0	3.1
Poland	Yes	294	750	1044	2373	4539	6912	123.9	165.2
Portugal	Yes	78	135	213	644	1002	1646	133.3	134.8
Romania	Yes	207	263	470	1228	2916	4144	168.8	90.1
Slovakia	Yes	38	14	52	340	225	564	111.6	61.9
Slovenia	Yes	13	7	19	129	184	313	97.8	36.5
Spain	Yes	556	1770	2326	2908	7684	10592	191.1	230.3
Sweden	Yes	70	9	79	625	804	1429	112.1	11.8
United Kingdom	Yes	488	234	722	4115	7202	11317	118.6	32.5
29 EU/EEA countries		**4122**	**6558**	**10680**	**31649**	**60532**	**92181**	**130.0[e]**	**108.3[e]**

JIACRA 2021

Figure 7: Comparison of consumption of antimicrobial classes in humans (a) and food-producing animals (b), in 29 EU/EEA countries for which data were available, both for humans and food-producing animals, 2017



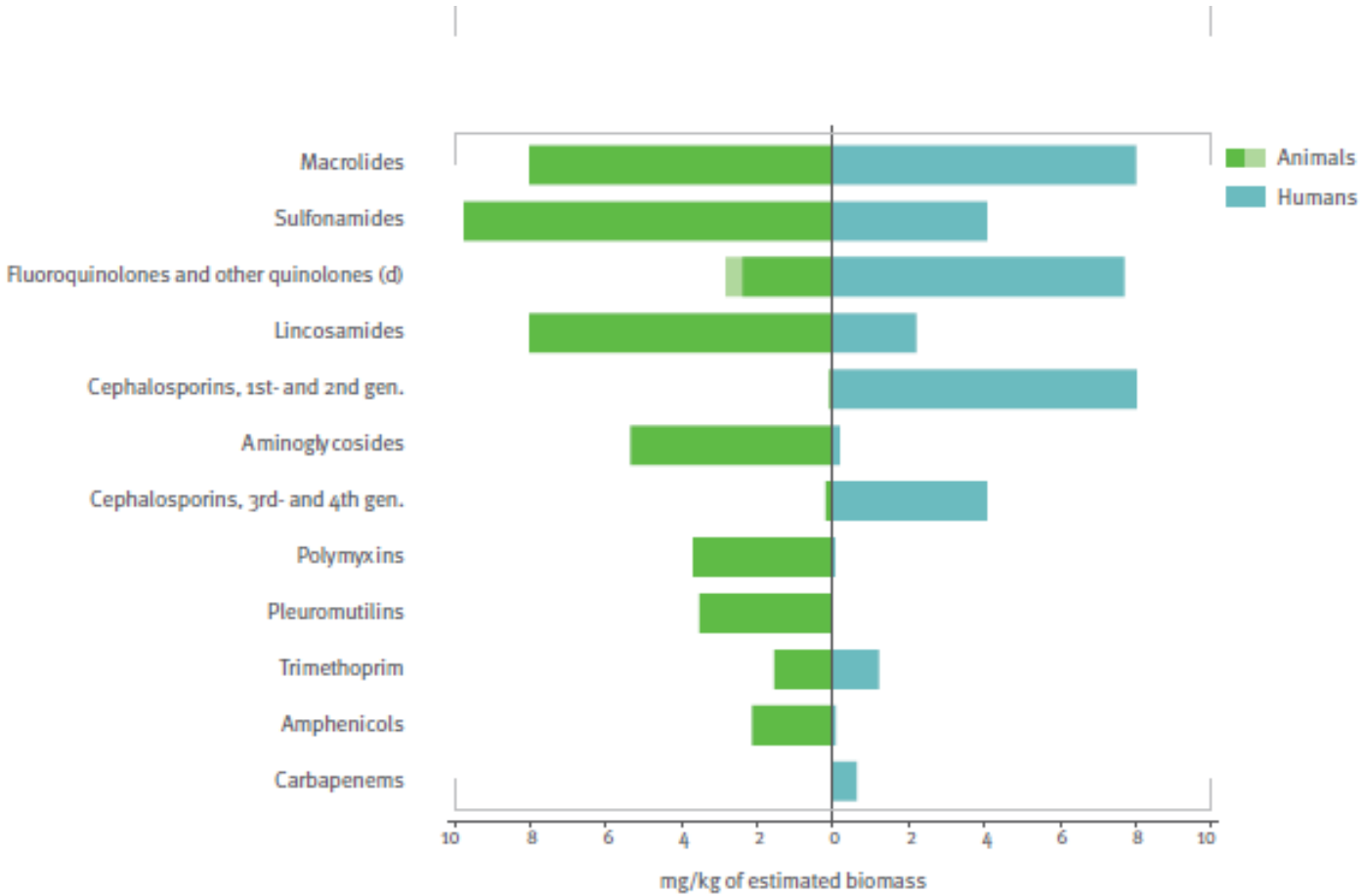
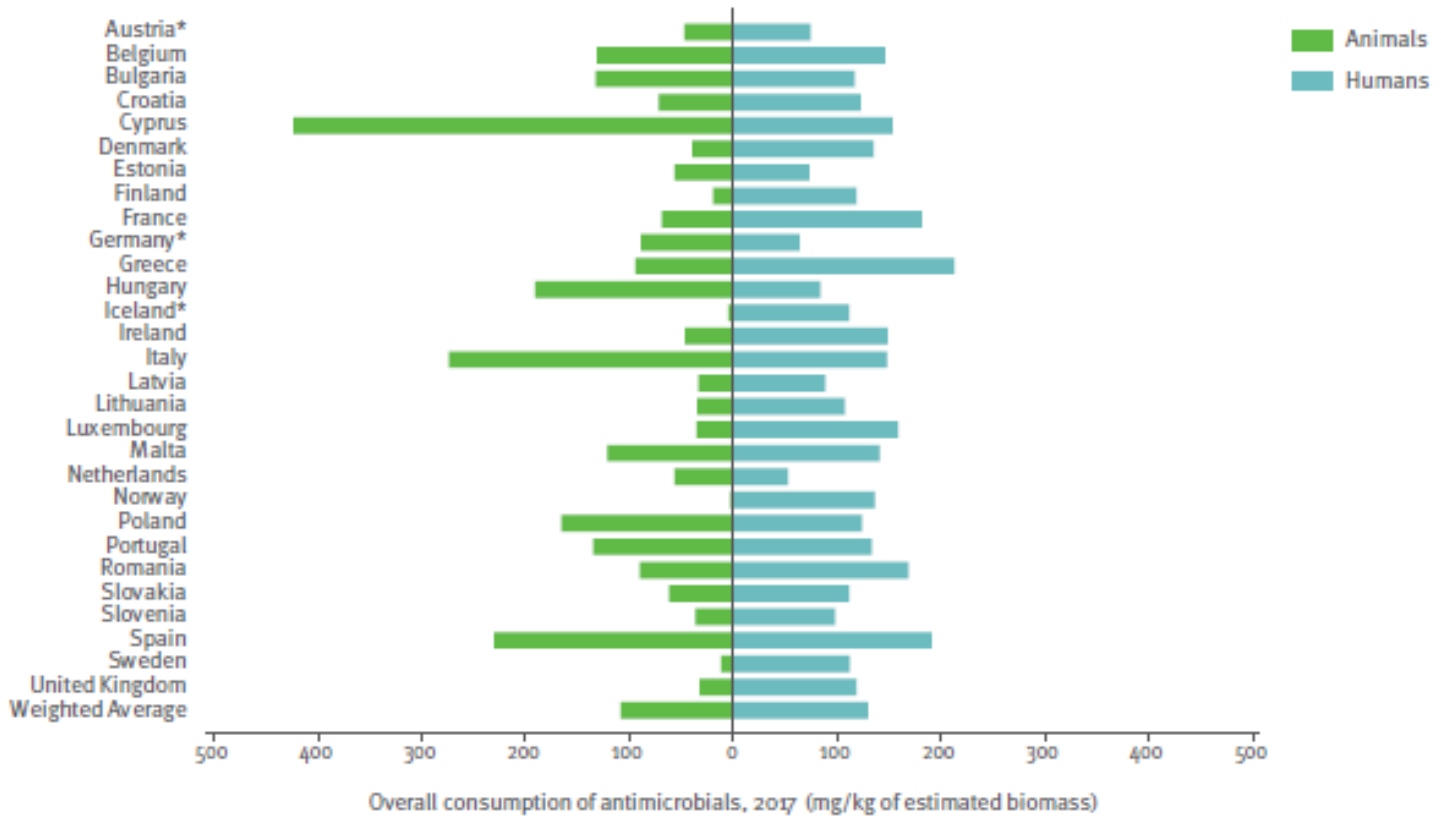
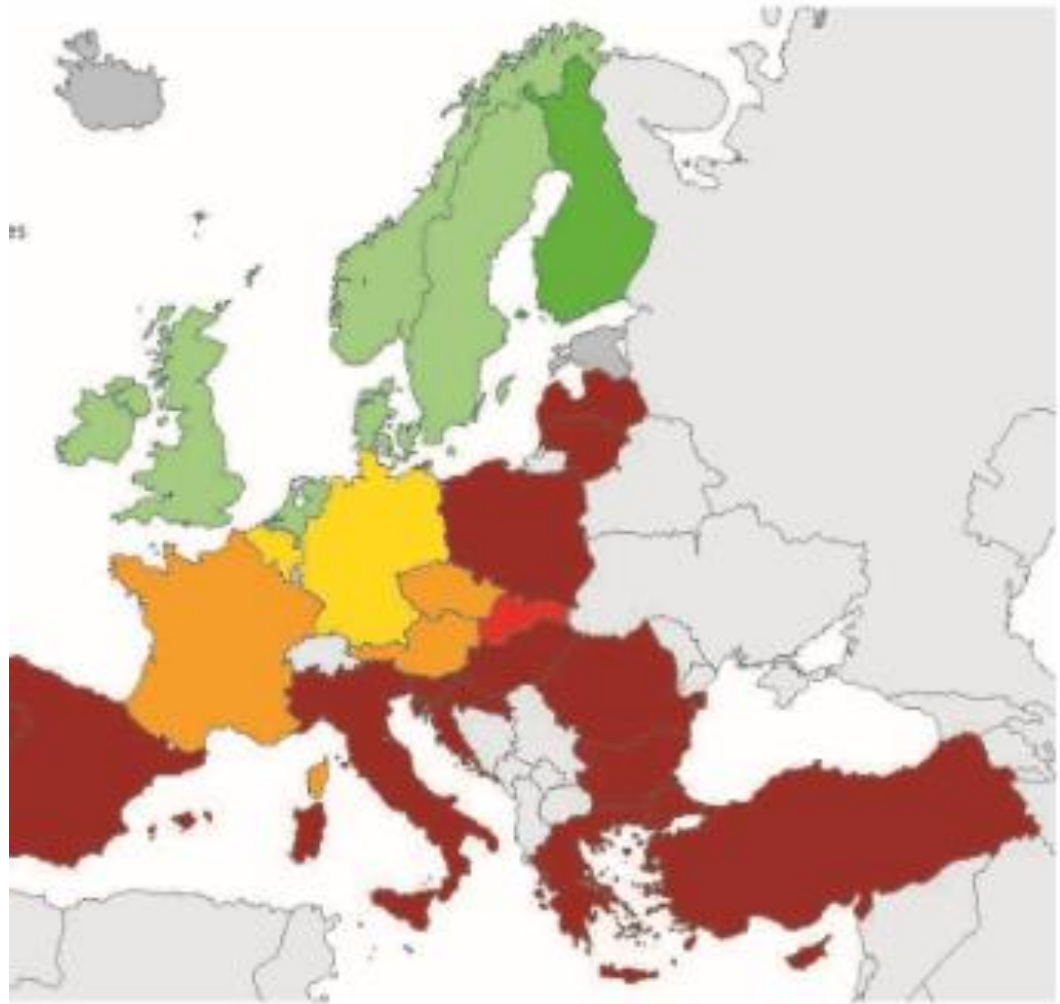

Macrolides
Sulfonamides
Fluoroquinolones and other quinolones (d)
Lincosamides
Cephalosporins, 1st- and 2nd gen.
Aminoglycosides
Cephalosporins, 3rd- and 4th gen.
Polymyxins
Pleuromutilins
Trimethoprim
Amphenicols
Carbapenems
Animals
Humans
10
8
6
4
2
0
2
4
6
8
10
mg/kg of estimated biomass

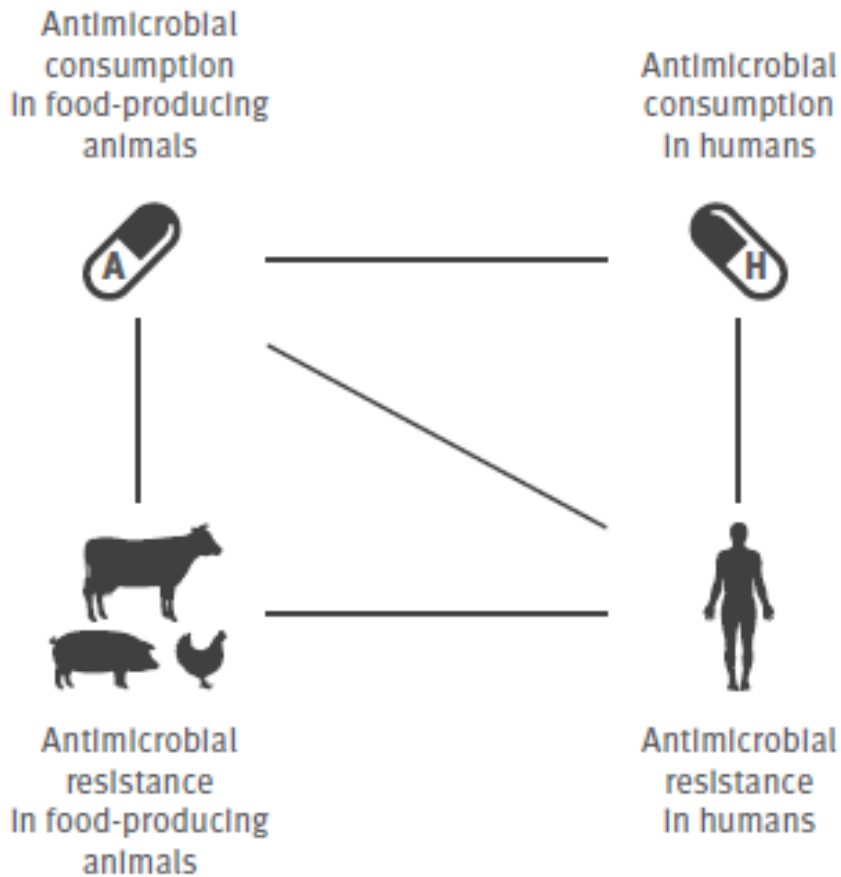
Figure 6: Comparison of biomass-corrected consumption of antimicrobials (milligrams per kilogram estimated biomass) in humans (a) and food-producing animals (b) by country, in 29 EU/EEA countries for which data were available both for humans and food-producing animals, 2017





Çiftlikteki direnç klinikteki direnç ile ilişkili mi?

Figure I: Schematic overview of the potential associations between antimicrobial consumption and antimicrobial resistance in humans and food-producing animals investigated in this report



Antimicrobial resistance in bacteria from food-producing animals (pigs, poultry, calves)

Antimicrobial resistance in bacteria from food-producing animals (poultry)

Antimicrobial resistance in bacteria from humans

Antimicrobial consumption in food-producing animals

Antimicrobial consumption in humans

The lines indicate significant associations:

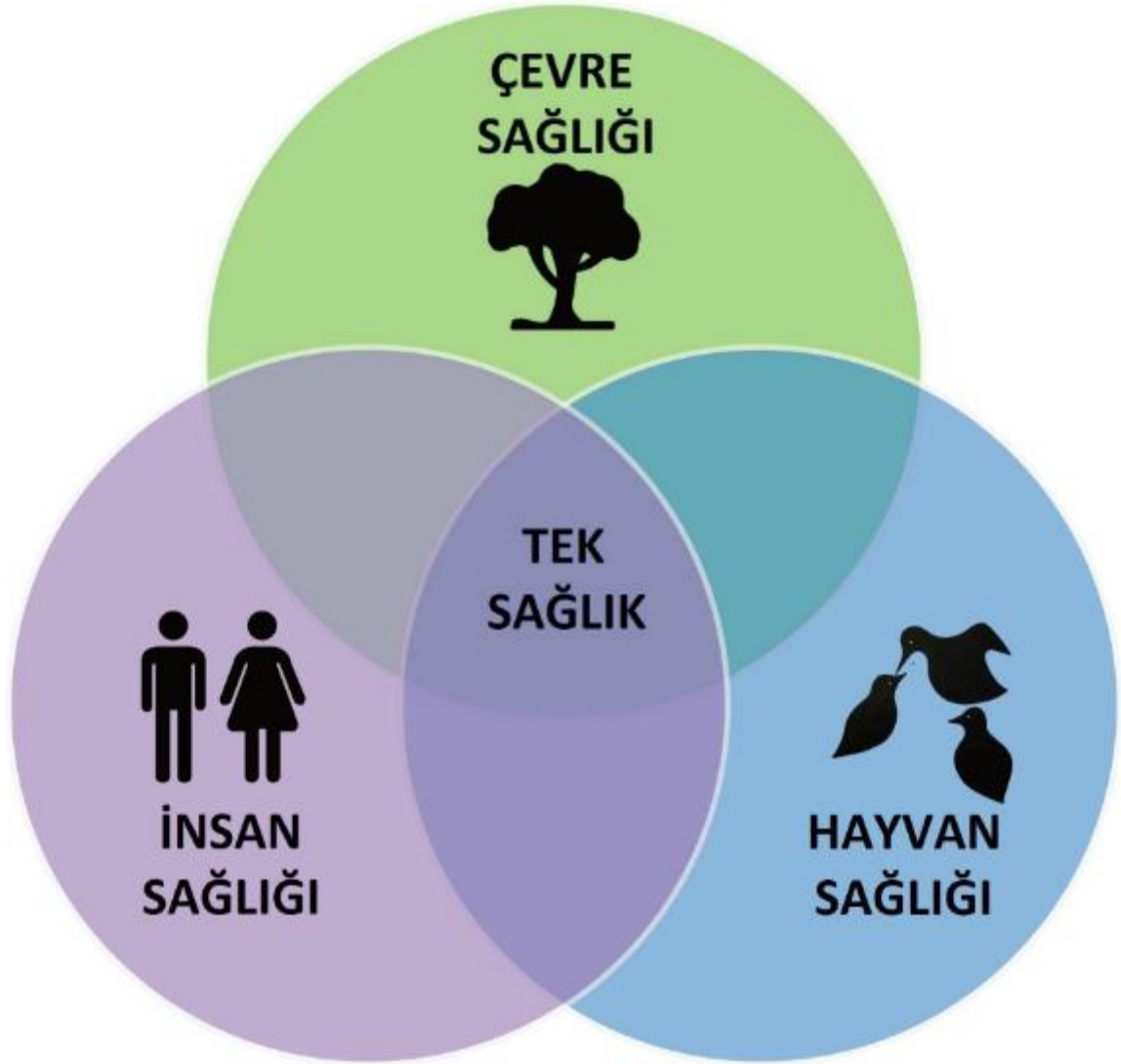
Statistically significant in multivariate analysis

Statistically significant in univariate analysis (when multivariate cannot be performed)

Statistically significant in univariate analysis < 1 year, but not confirmed in multivariate analysis

Analysis not performed

Antimicrobial class	Association between antimicrobial consumption in humans and food-producing animals	Association between antimicrobial consumption and antimicrobial resistance in humans and food-producing animals			
		Klebsiella pneumoniae	*Escherichia coli*	*Salmonella* spp.	*Campylobacter jejuni*
Carbapenems					
Third- and 4th- generation cephalosporins[a]					
Fluoroquinolones and other quinolones[b]					
Polymyxins					
Aminopenicillins					
Macrolides					
Tetracyclines					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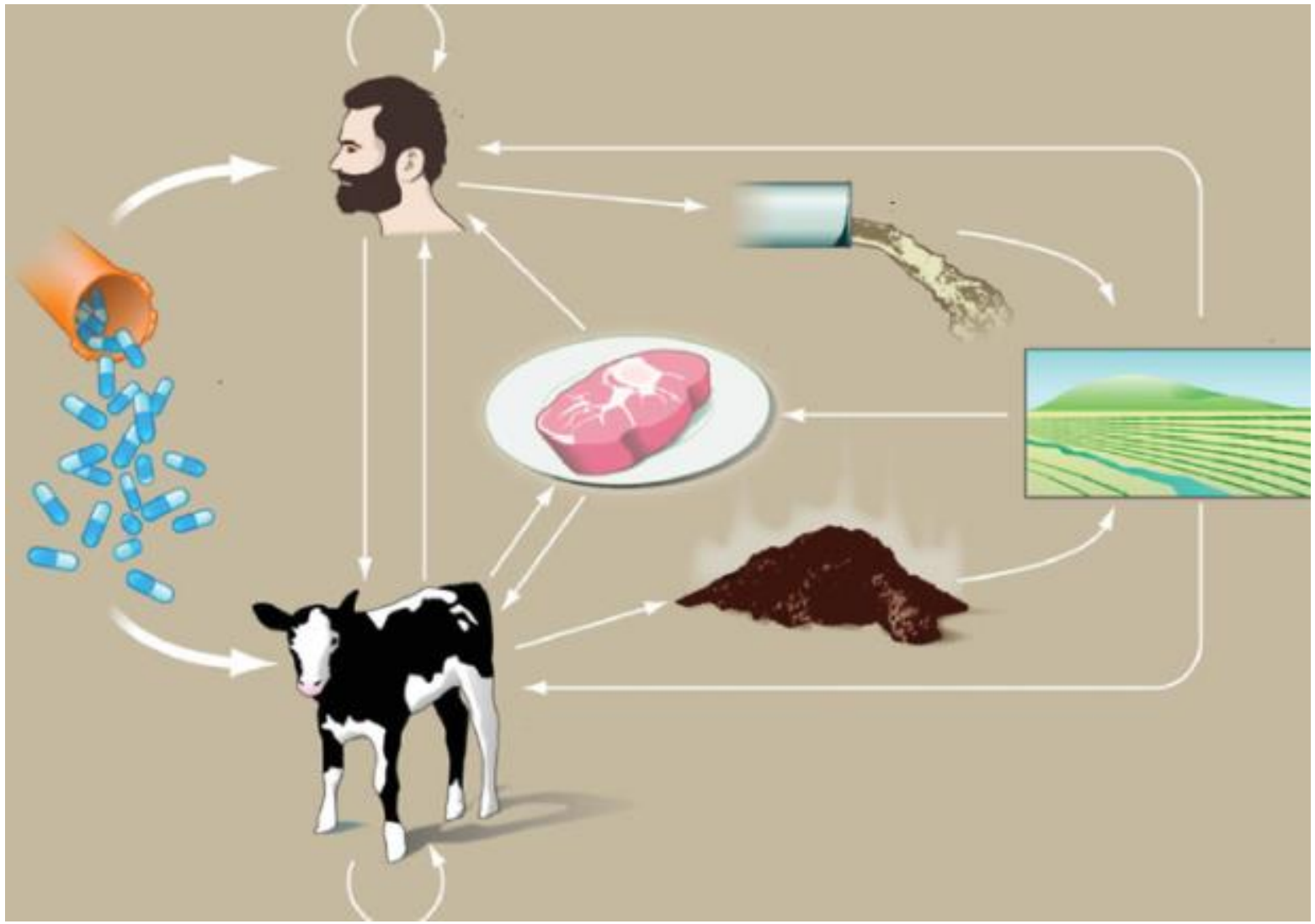
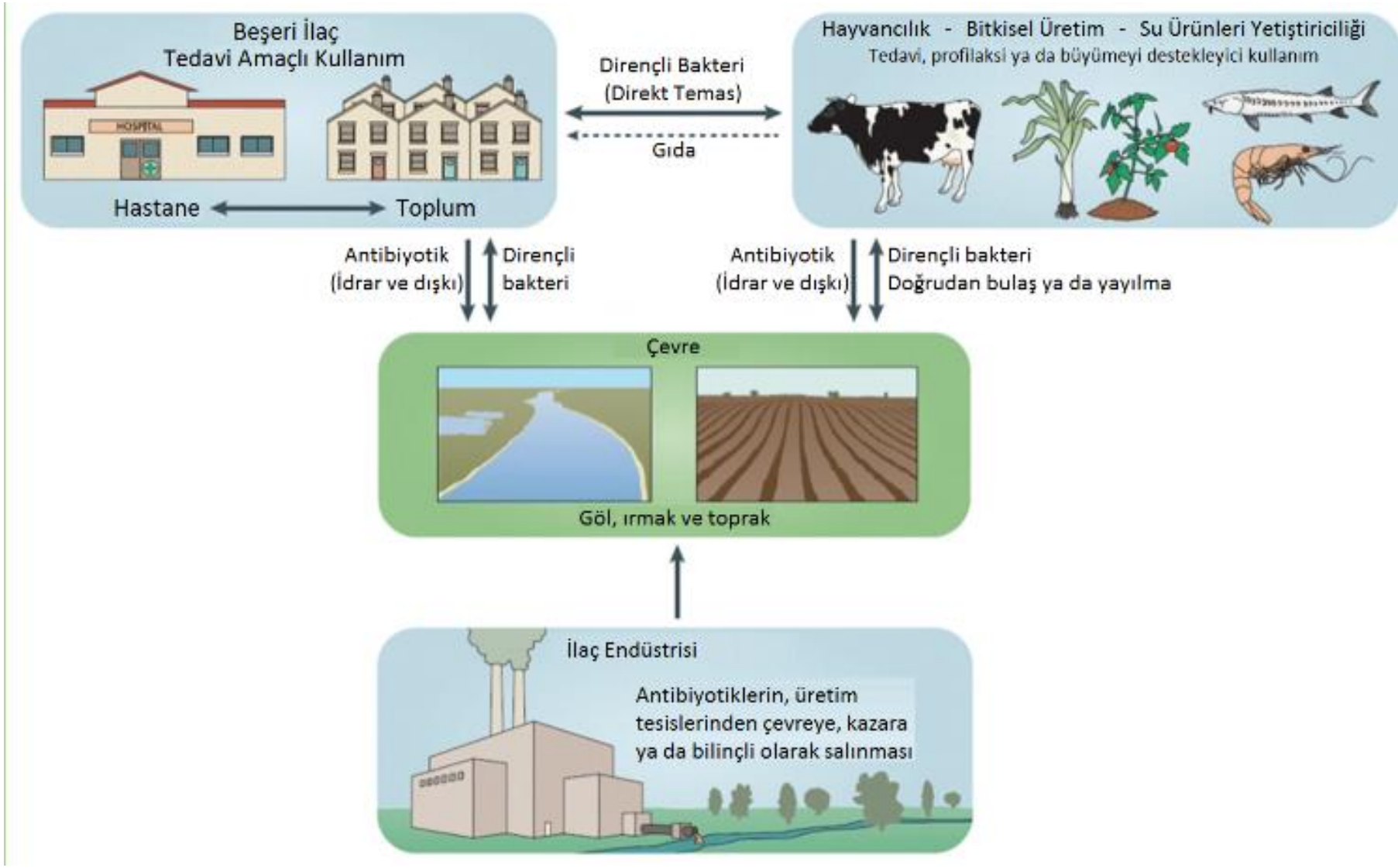
SAĞLIĞI




Beşeri İlaç
Tedavi Amaçlı Kullanım
HOSPITAL
Hastane
Toplum
Dirençli Bakteri
(Direkt Temas)
Gıda
Hayvancılık - Bitkisel Üretim - Su Ürünleri Yetiştiriciliği
Tedavi, profilaksi ya da büyümeyi destekleyici kullanım
Antibiyotik
(İdrar ve dışkı)
Dirençli
bakteri
Antibiyotik
(İdrar ve dışkı)
Dirençli bakteri
Doğrudan bulaş ya da yayılma
Çevre
Göl, ırmak ve toprak
İlaç Endüstrisi
Antibiyotiklerin, üretim
tesislerinden çevreye, kazara
ya da bilinçli olarak salınması

2017 raporu

Tarım ürünlerinde (su ürünleri dahil) potansiyel kontaminasyon riski mevcut

Geleneksel su muamele yöntemleri ile antibiyotikleri uzaklaştırmak zor

Farmasötik üretimden kaynaklanan kirlilik önemli

Çevresel atık yönetimi direnç ile mücadelede kilit role sahip


Biocides
Acaricides
Leather
Arthropods
In-can

Toprak

Antimikrobiyal direncin orijinal kaynağı
ve rezervuarı

Direnç genleri antibiyotikler üretilmeye
başlamadan önce de vardı

Salmonella
Campylobacter

Karbapenem direnci-NDM-1
Kolistin direnci-mcr-1
E. coli ST131
MRSA
VRE

Direncin yayılımı ile ilgili
kabul edilen hipotez

Yeni bir direnç mekanizması
belli bir yerde ortaya çıkar
ve dünyaya yayılır

Mobil genetik elemanlar
habitat sınırlarını aşar

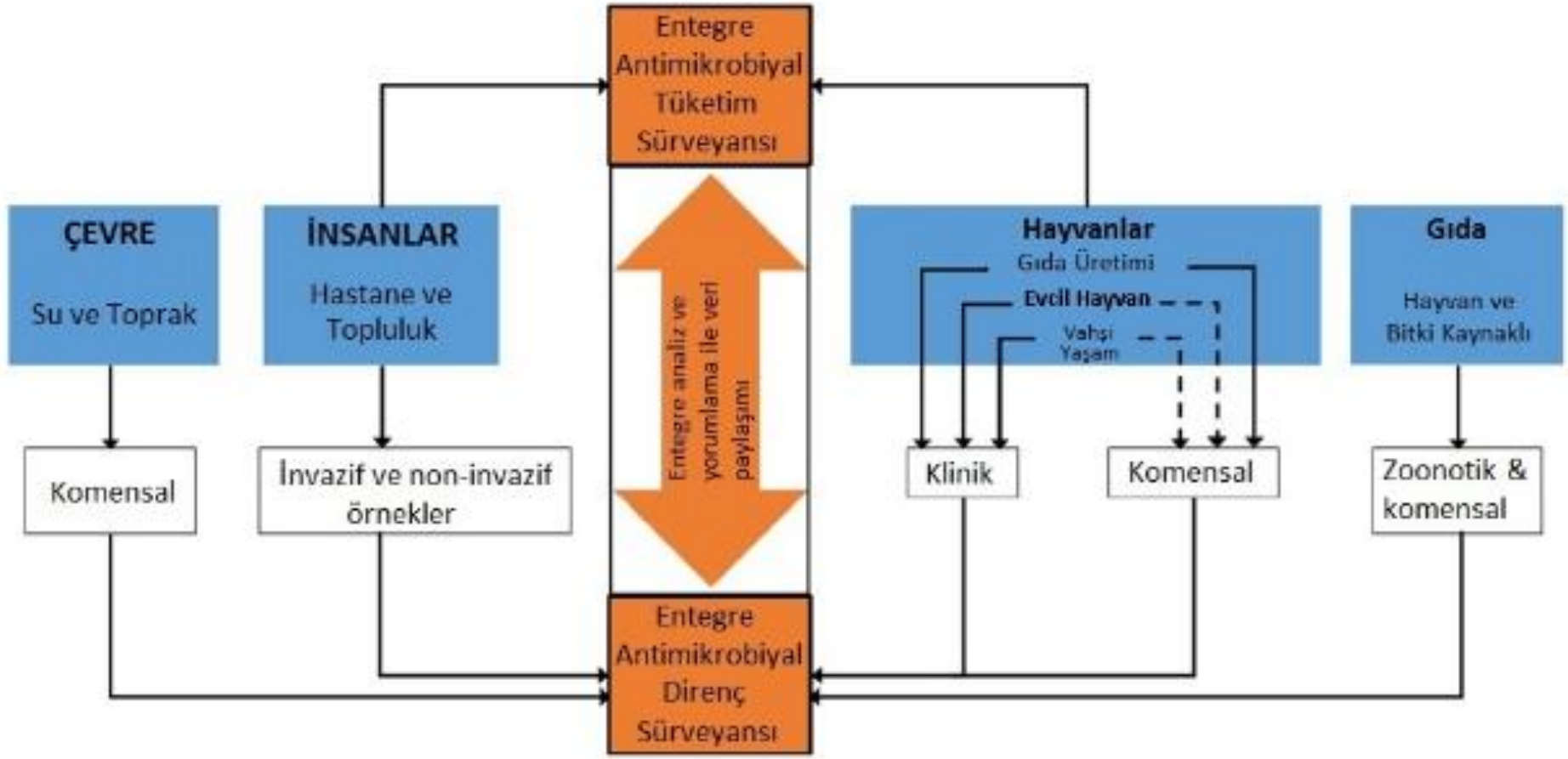

Food and Agriculture
Organization of the
United Nations
OiE
WORLD ORGANISATION
FOR ANIMAL HEALTH
World Health
Organization

Antimicrobial Resistance

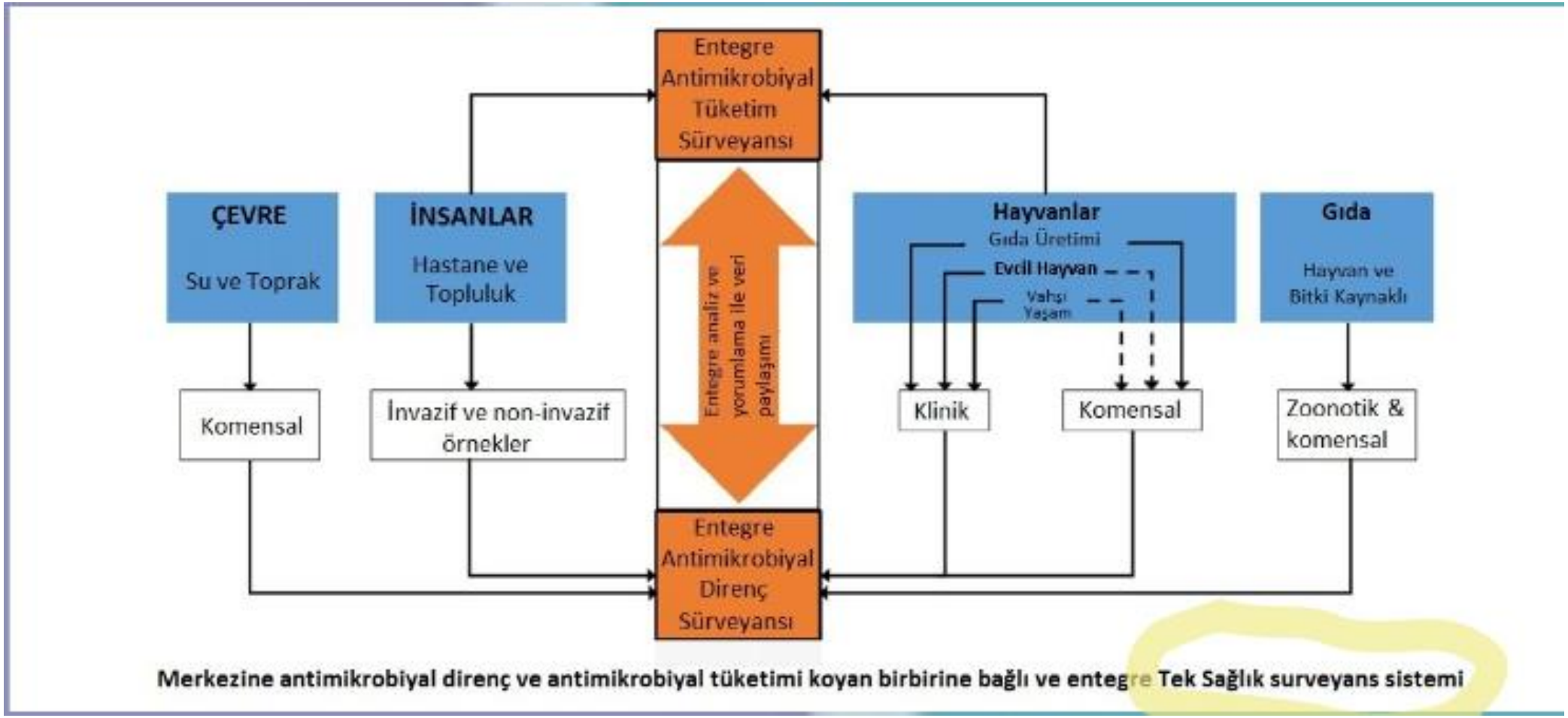
A MANUAL FOR DEVELOPING

NATIONAL ACTION PLANS

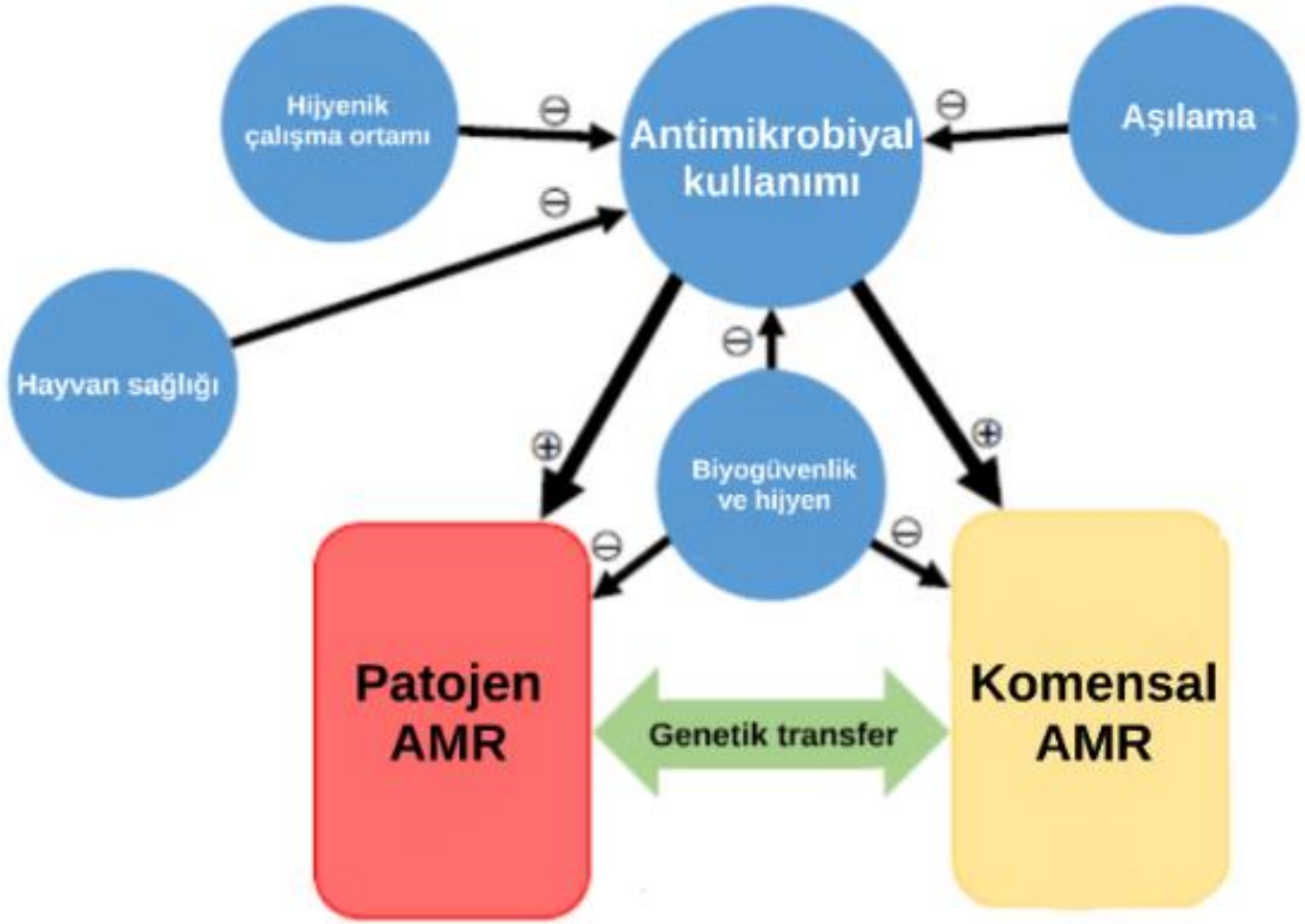
Ulusal AMR surveyans- var
Aksiyon planı-çalışmalar devam ediyor



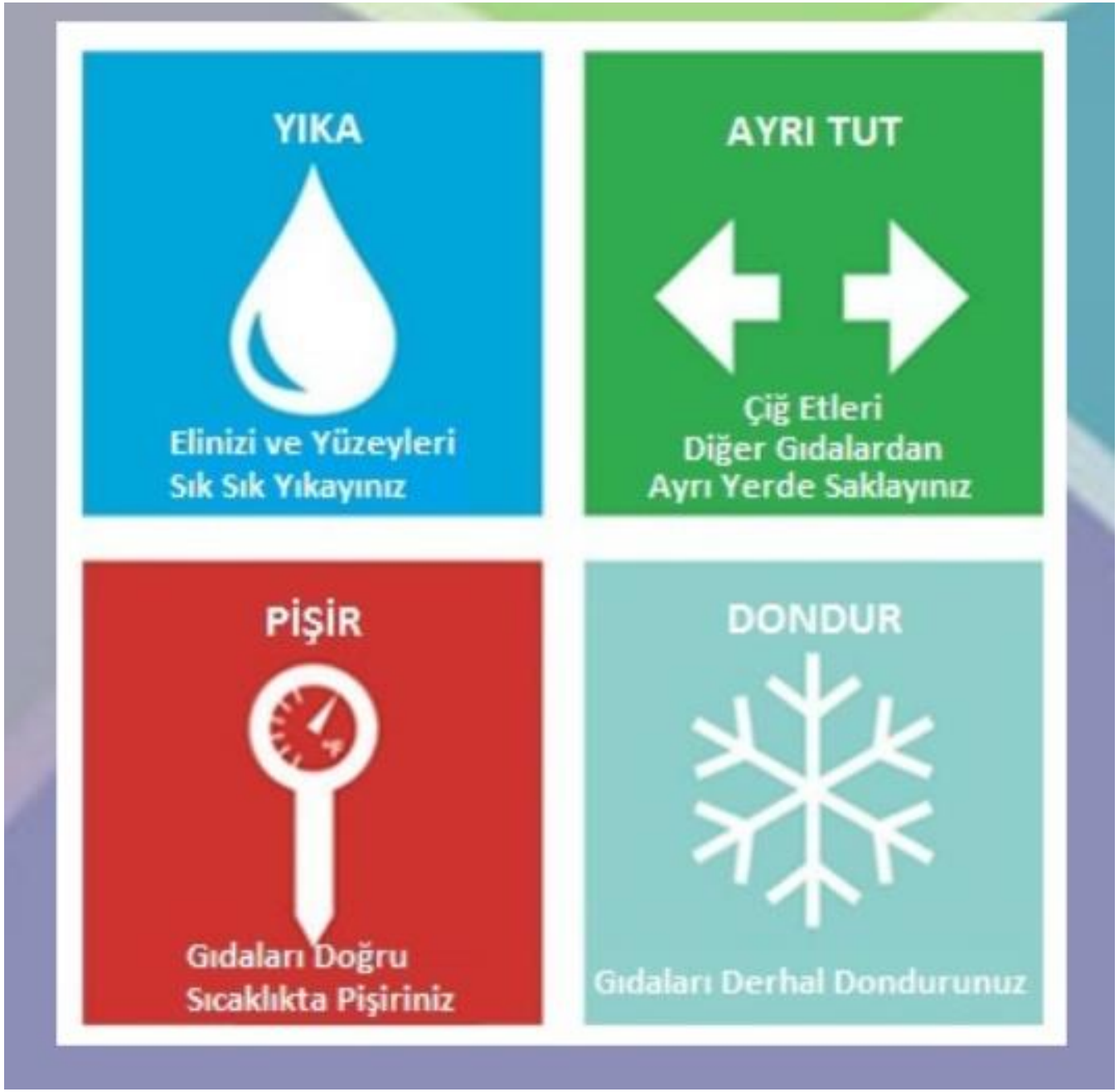
Merkezine antimikrobiyal direnç ve antimikrobiyal tüketimi koyan birbirine bağlı ve entegre Tek Sağlık surveyans sistemi



Merkezine antimikrobiyal direnç ve antimikrobiyal tüketimi koyan birbirine bağlı ve entegre Tek Sağlık surveyans sistemi


Hijyenik çalışma ortamı
Antimikrobiyal kullanımı
Aşılama
Hayvan sağlığı
Biyogüvenlik ve hijyen
Patojen AMR
Genetik transfer
Komensal AMR


Pnömokok aşısı
47%
Antibiyotik kullanımında azalma


YIKA
Elinizi ve Yüzeyleri
Sık Sık Yıkayınız
AYRI TUT
Çiğ Etleri
Diğer Gıdalardan
Ayrı Yerde Saklayınız
PİŞİR
Gıdaları Doğru
Sıcaklıkta Pişiriniz
DONDUR
Gıdaları Derhal Dondurunuz

CDC

EGO

ECO

TMC-Tek Sağlık Çalışma Grubu
Tek Sağlık Sempozyumu


Tek Sağlık
Veterinerlik
Halk Sağlığı
Tıp
Mikrobiyoloji
Moleküler Biyoloji
Ekoloji
Sağlık
Ekonomisi
Çevre Sağlığı
Bireyin
Sağlığı
Toplum
Sağlığı
Ekosistem
Sağlığı
Bakteriyel
Enfeksiyonlar
Viral
Enfeksiyonlar
Vektör Kaynaklı
Enfeksiyonlar
Parazit
Enfeksiyonları
Antimikrobiyal
Direnci
Zoonotik Enfeksiyonlar
Biyolojik
Tehditler
Gıda Güvenliği
Global
Sağlık
Sürveyans
Önlemler
Aşılar ve
Terapötik
Vektör
Kontrolü
Sanitasyon
İnsan ve Hayvanlarda
Metabolik Bozukluklar
Karşılaştırmalı Tıp/
Translasyonel Tıp
İnsan ve Hayvanlarda
Kas İskelet Hastalıkları
İnsan ve Hayvanlarda
Kanser ve Kardiyovasküler
Hastalıklar
İnsan - Hayvan
İlişkisi
Çevresel Tehlikelere
Maruz Kalma