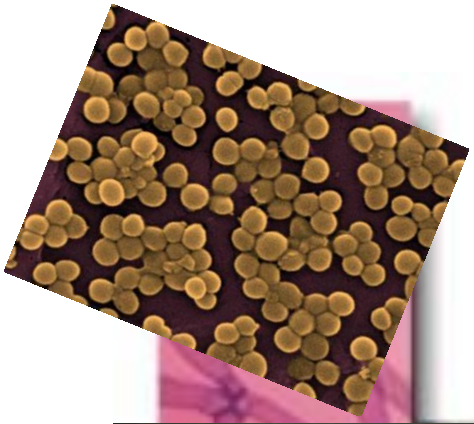
Antibiyotik Yönetiminde Güncel Durum

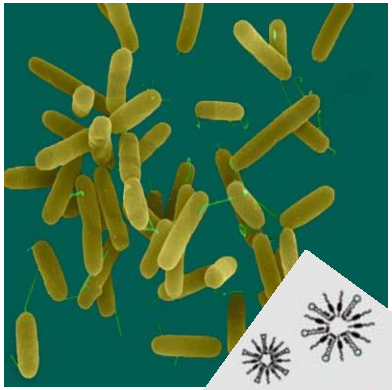
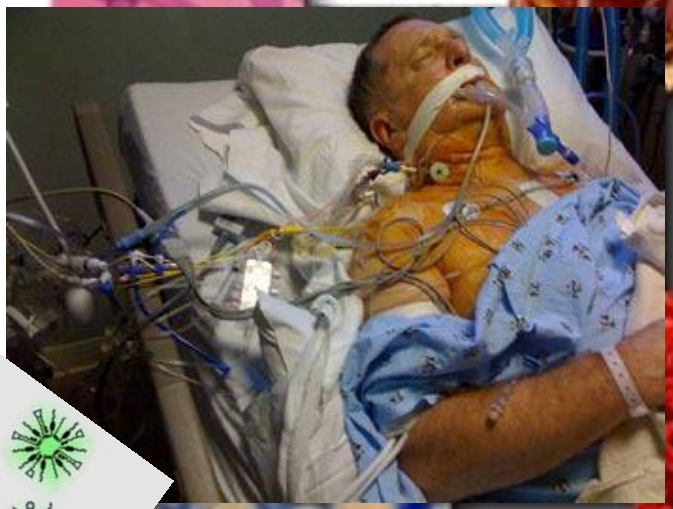
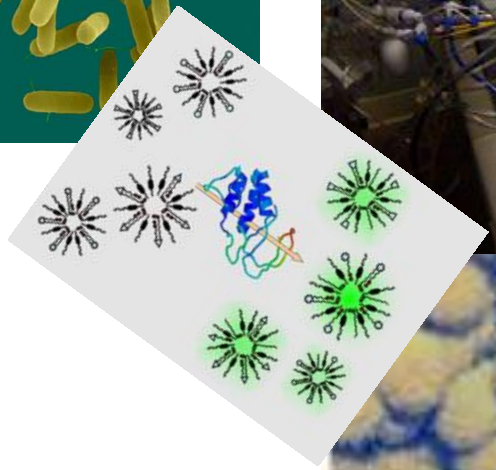
Dr. Oral ÖNCÜL
İÜ İstanbul Tıp Fakültesi
İnfeksiyon Hst.ve Kl. Mik. ABD

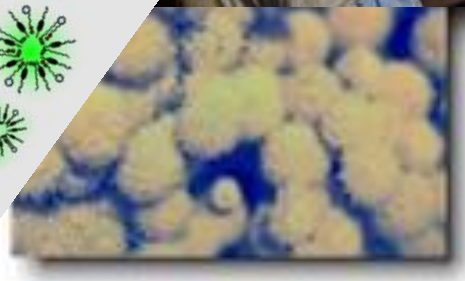
Alexander Fleming..

- 1928 *Penici*
- 1938 Penisil
- Düşük konsantrasyonlarda direnç..

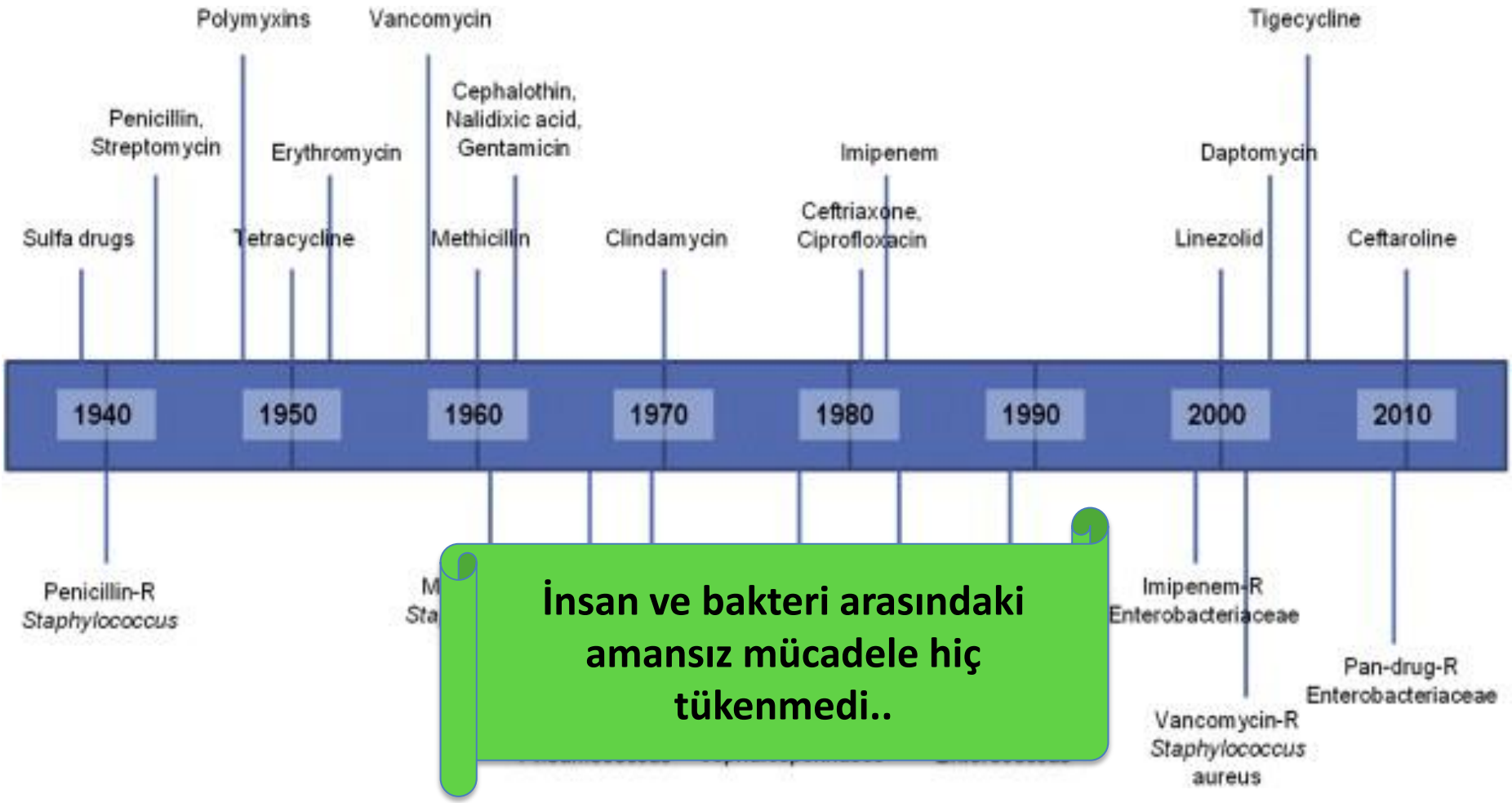
Tüm Antibiyotikler için geçerli olabilecek öngörü..





Antiyotik ve Direnç Gelişimi Arasındaki Amansız Takip..



Antimikrobik Direncin Genel Mekanizmaları

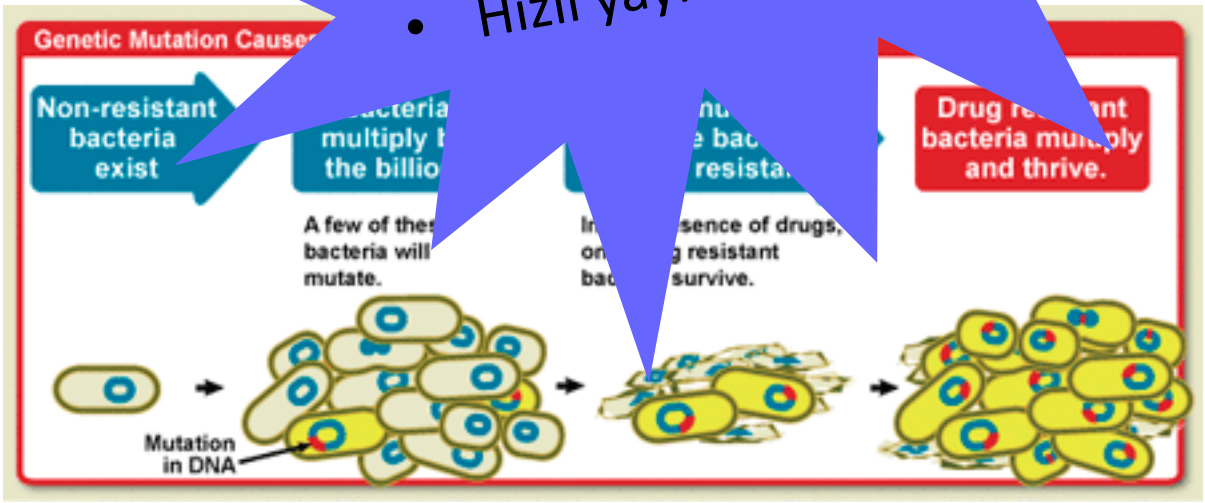
Gen Mutasyonu

- Spontan gelisir
- Tek nükleotid
- Gen başına 1

M l Genetik Elemanlar

- tal transfer
- ar
- er (Konjugasyon..)

- Birden fazla AB
- Farklı mekanizmalar
- Farklı bakteri türleri
- Hızlı yayılım



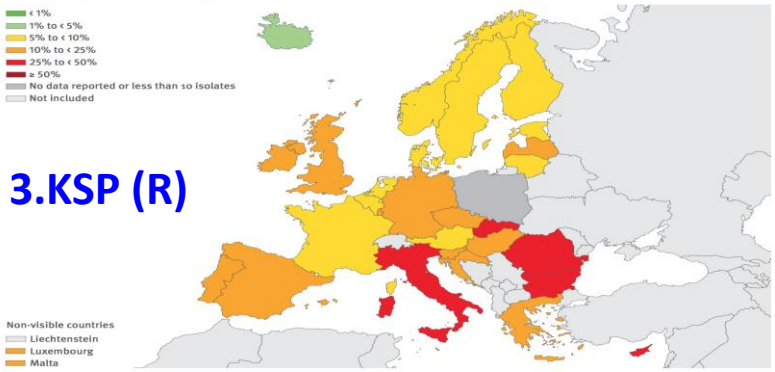
Antibiyotik Direnci

- Antibiyotik Direnci Global Bir Sorun mu?

Escherichia coli (EARS-2014) *Klebsiella pneumoniae*

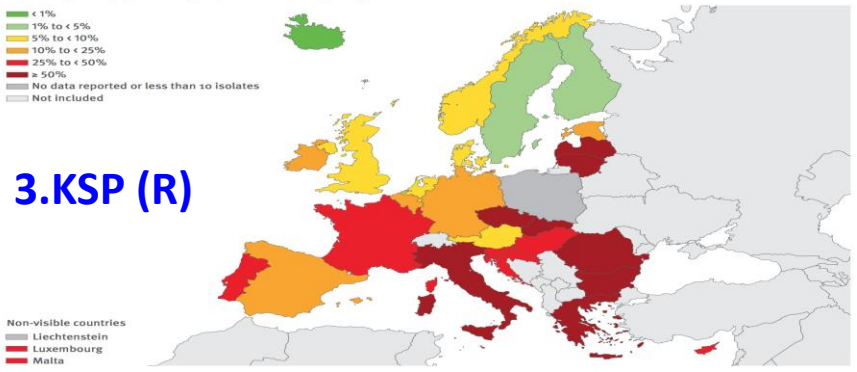
3.KSP (R)

Figure 3.2. *Escherichia coli*. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2014



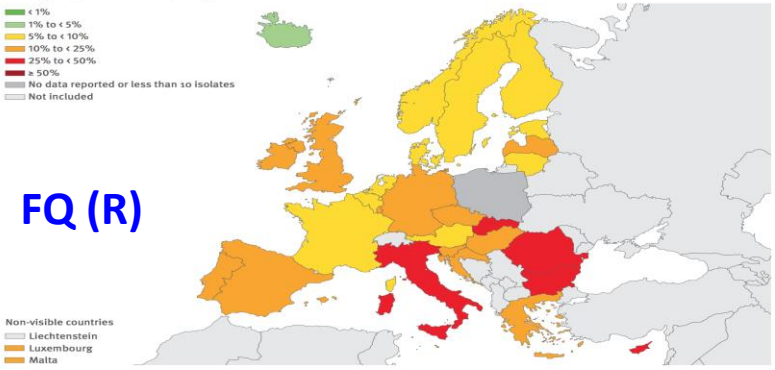
3.KSP (R)

Figure 3.7. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2014



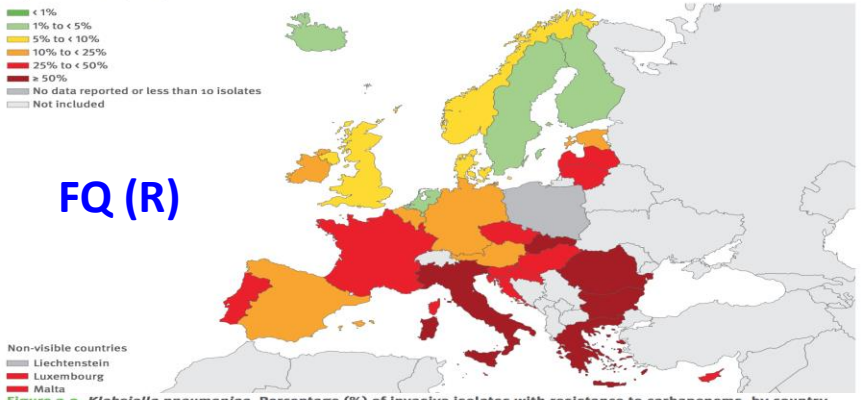
FQ (R)

Figure 3.2. *Escherichia coli*. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2014



FQ (R)

Figure 3.6. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to fluoroquinolones, by country, EU/EEA countries, 2014

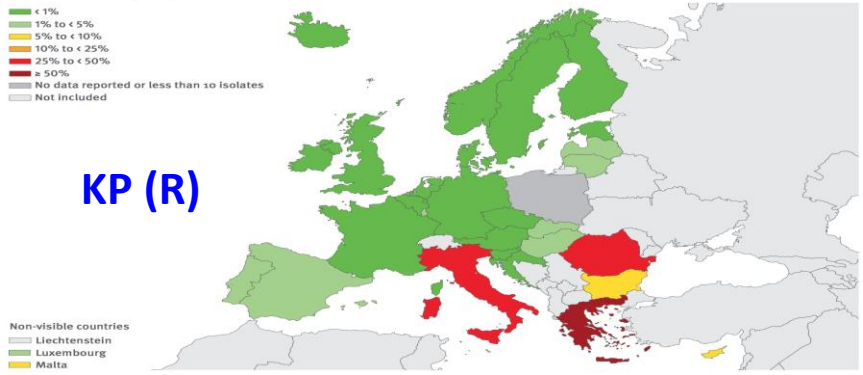


KP (R)

Figure 3.4. *Escherichia coli*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2014

KP (R)

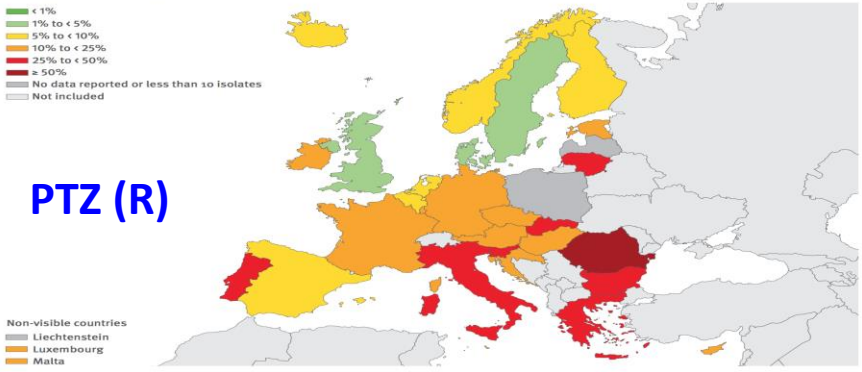
Figure 3.9. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2014



Pseudomonas aeruginosa (EARS 2014)

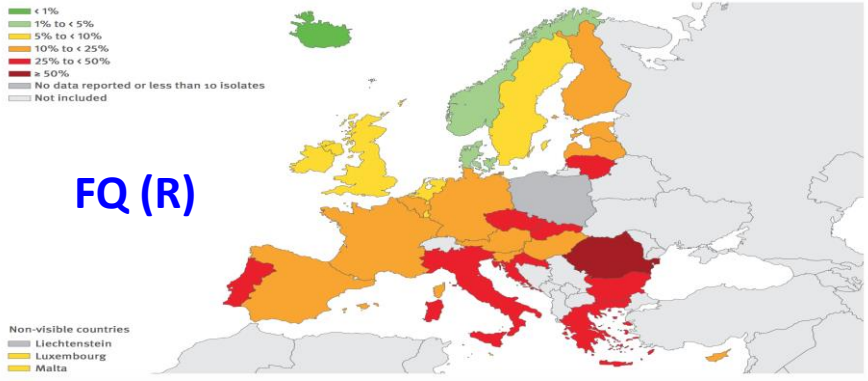
PTZ (R)

Figure 3.11. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to piperacillin + tazobactam, by country, EU/EEA countries, 2014



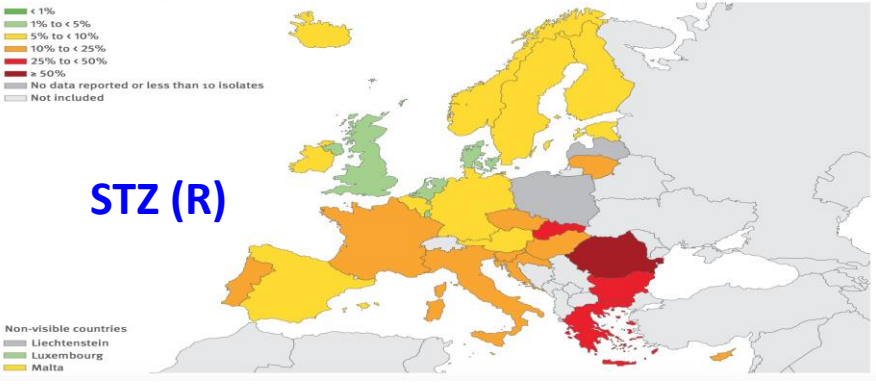
FQ (R)

Figure 3.12. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to fluoroquinolones, by country, EU/EEA countries, 2014



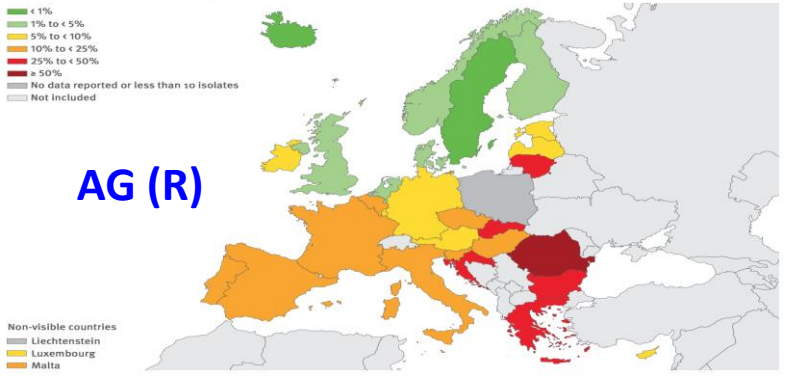
STZ (R)

Figure 3.13. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to ceftazidime, by country, EU/EEA countries, 2014



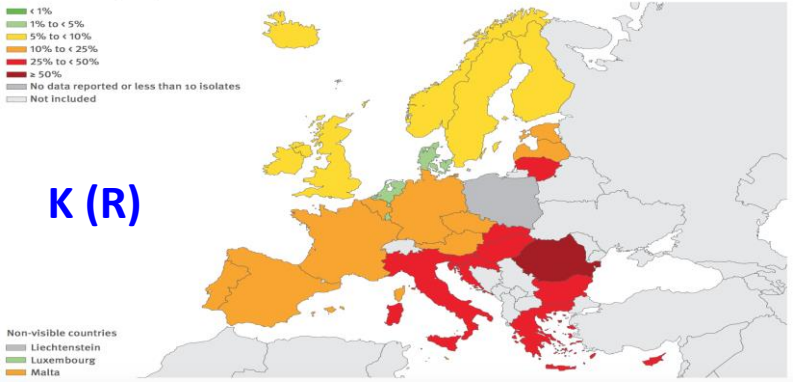
AG (R)

Figure 3.14. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to aminoglycosides, by country, EU/EEA countries, 2014



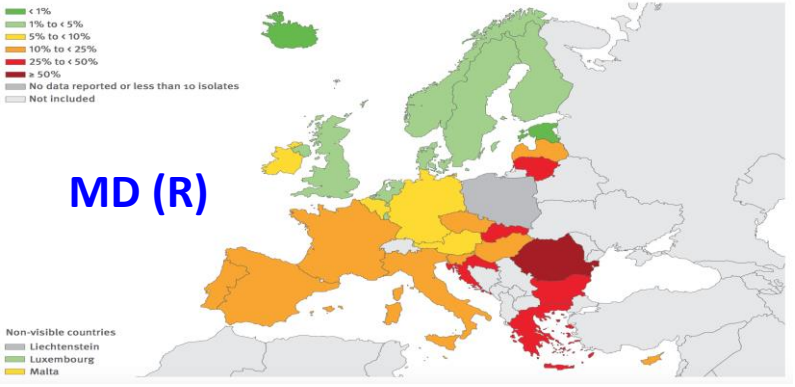
K (R)

Figure 3.15. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2014



MD (R)

Figure 3.16. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with combined resistance (resistance to three or more antimicrobial groups among piperacillin + tazobactam, ceftazidime, fluoroquinolones, aminoglycosides and carbapenems), by country, EU/EEA countries, 2014



Acinetobacter baumannii (EARS 2014)

Figure 3.17. *Acinetobacter* spp. Percentage (%) of invasive isolates with resistance to fluoroquinolones, by country, EU/EEA countries, 2014

Florokinolon (R)

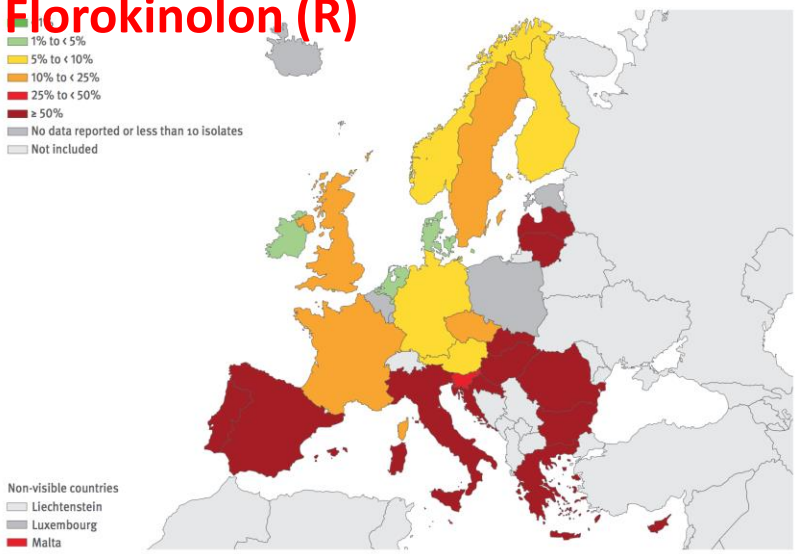


Figure 3.18. *Acinetobacter* spp. Percentage (%) of invasive isolates with resistance to aminoglycosides, by country, EU/EEA countries, 2014

Aminoglikozid (R)

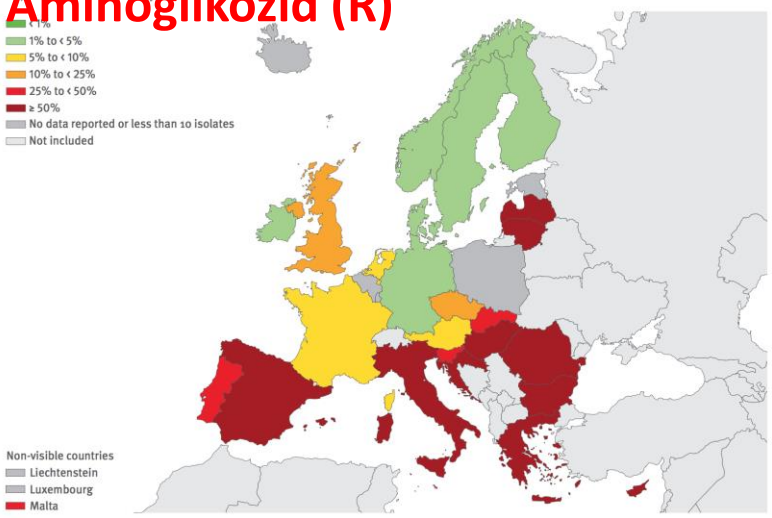
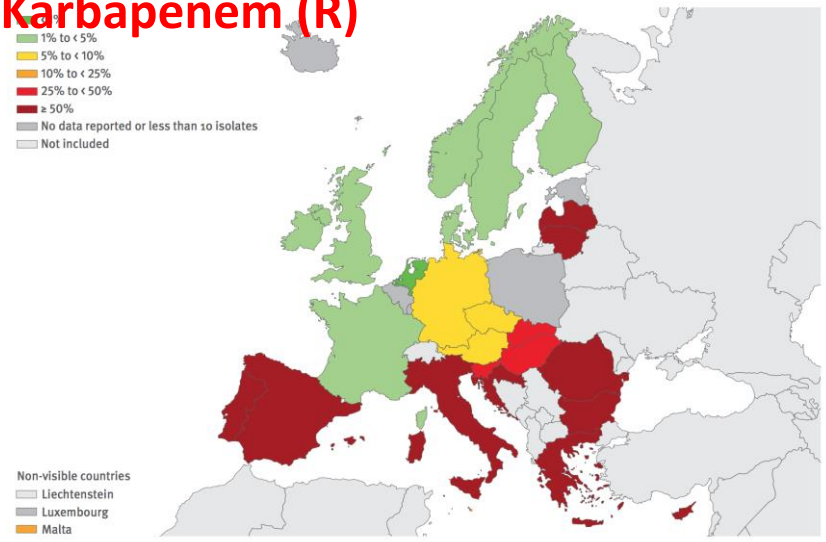


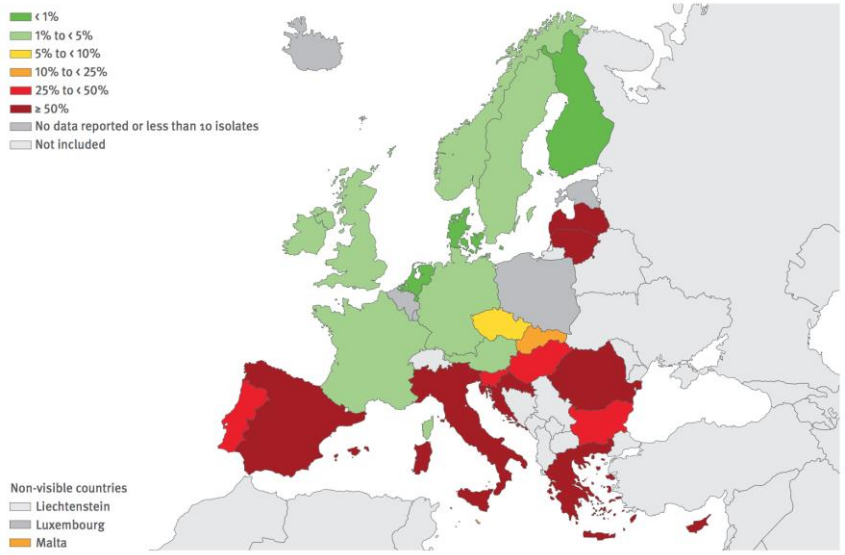
Figure 3.19. *Acinetobacter* spp. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2014

Karbapenem (R)

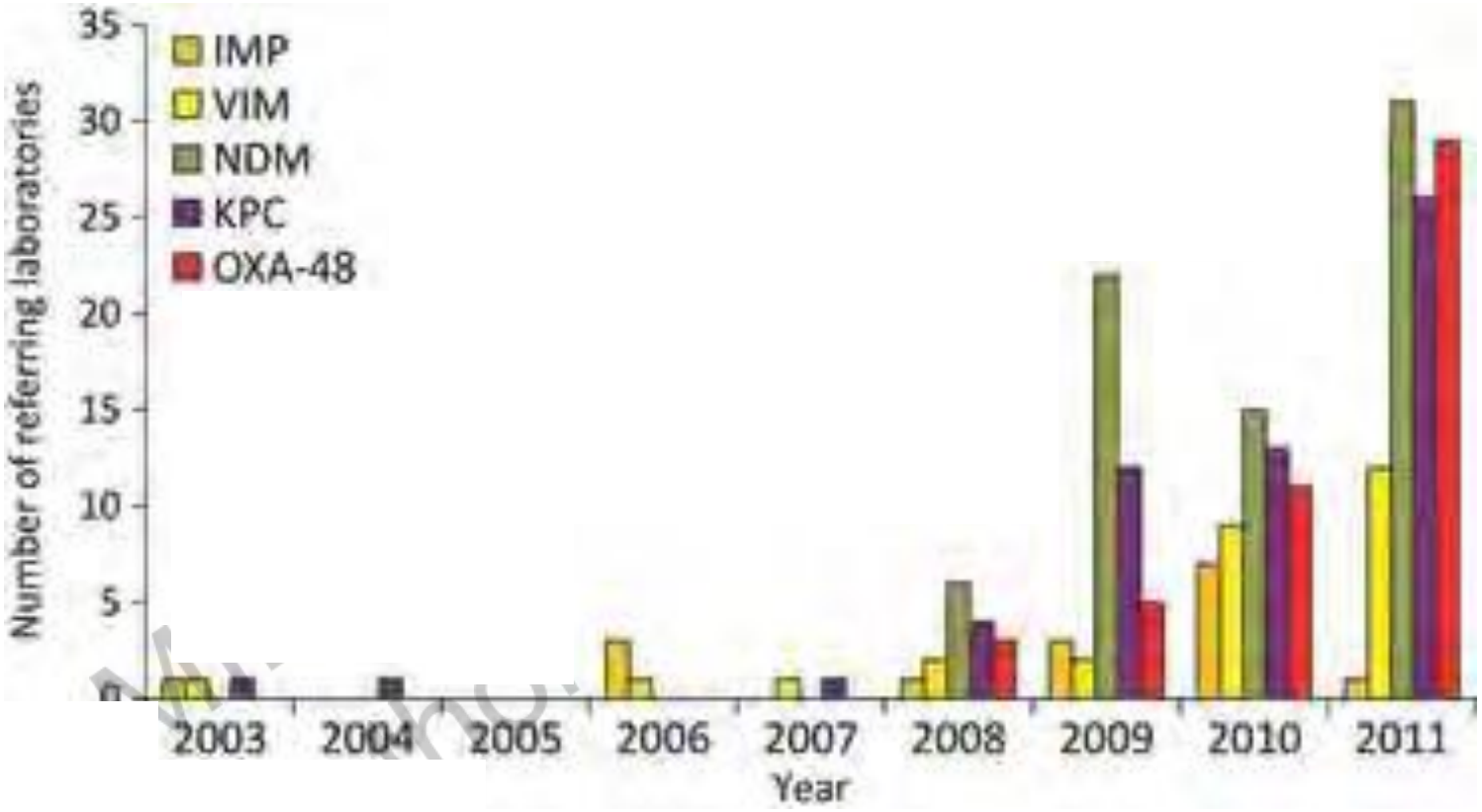


MD (R)

Figure 3.20. *Acinetobacter* spp. Percentage (%) of invasive isolates with combined resistance to fluoroquinolones, aminoglycosides and carbapenems, by country, EU/EEA countries, 2014



Global Bir Sorun: Gram Negatiflerde Çoklu Antibiyotik Direnci



Clinical Microiology and Infection, Vol:18, 413-438

Staphylococcus aureus (MRSA)

Enterococcus faecium (VRE)

Figure 3.23. *Staphylococcus aureus*. Percentage (%) of invasive isolates with resistance to meticillin (MRSA), by country, EU/EEA countries, 2014

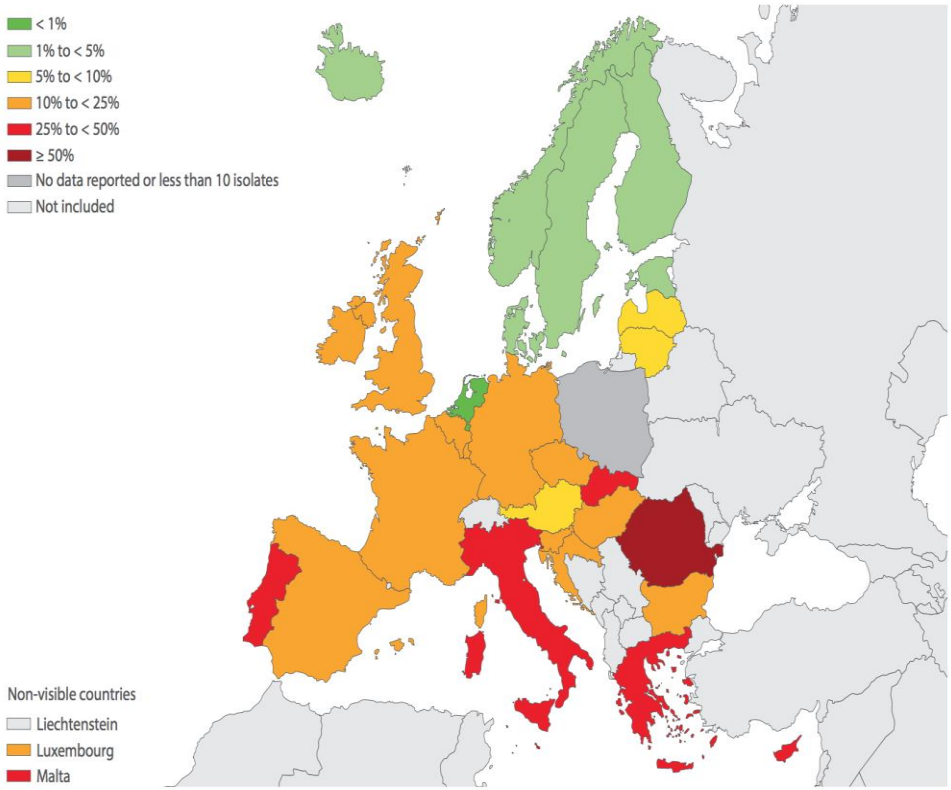
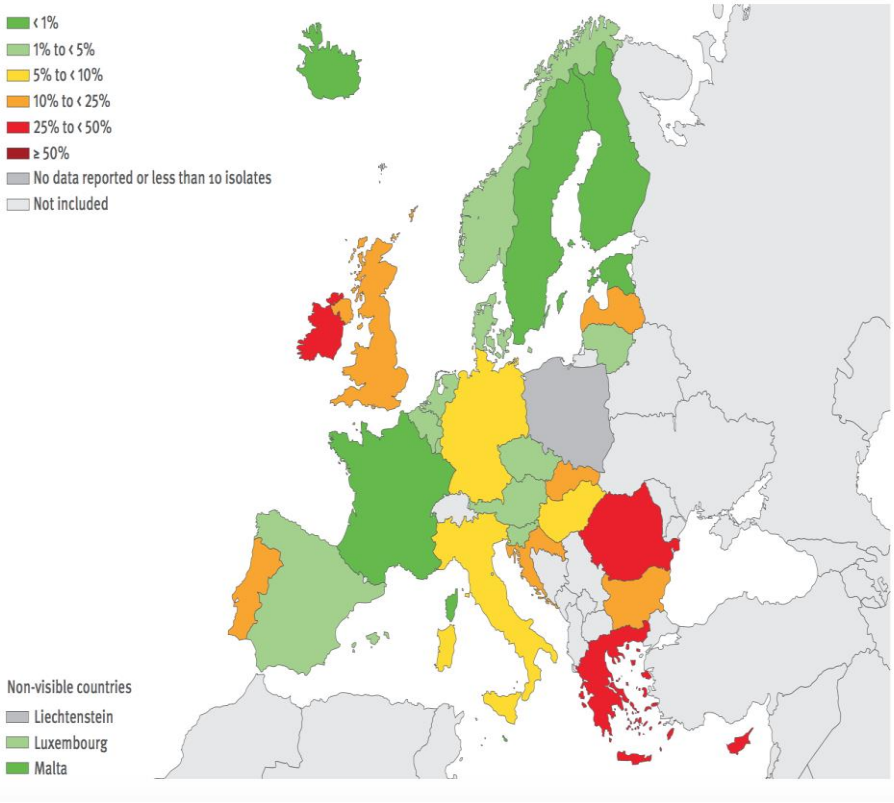
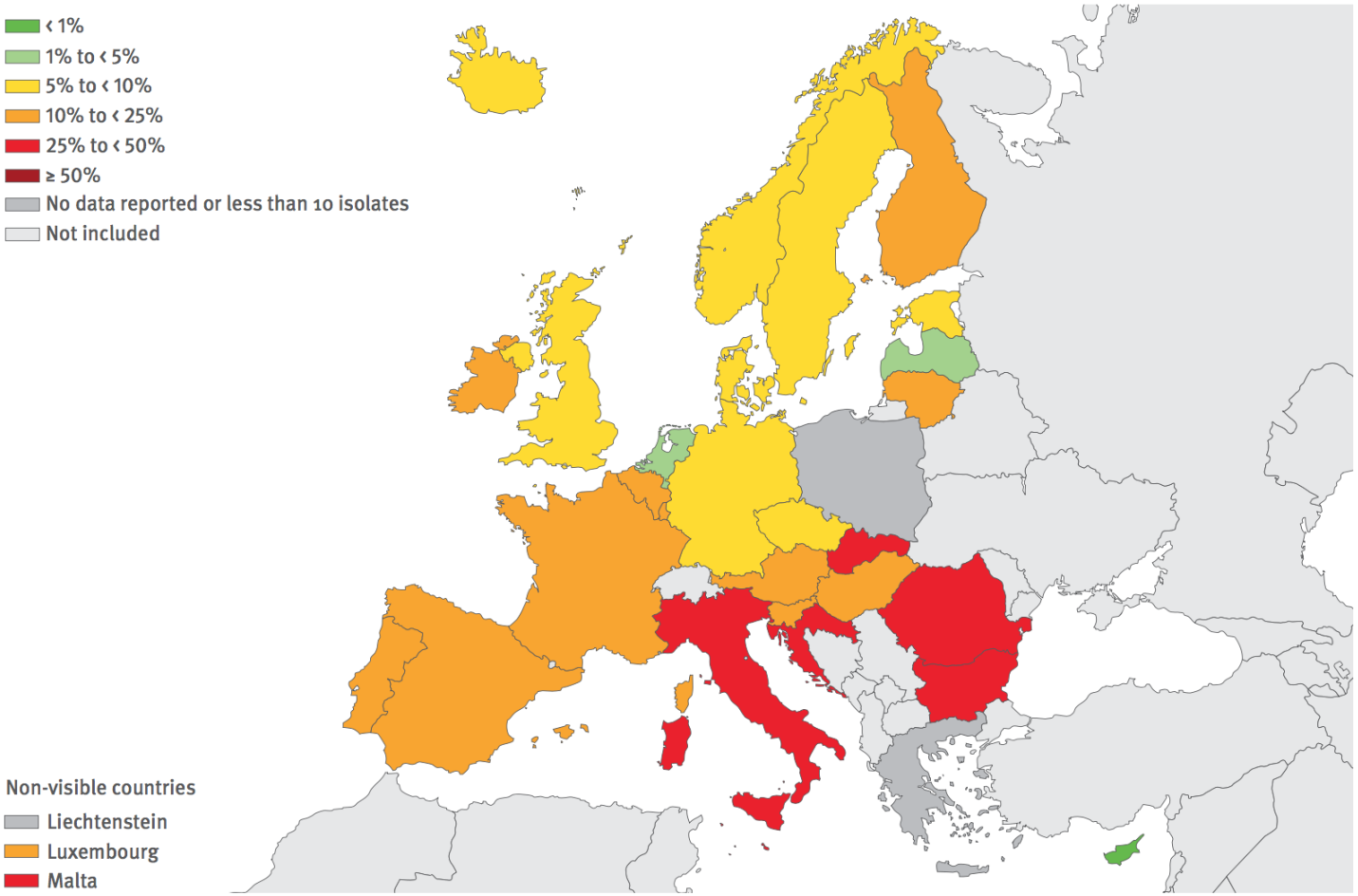


Figure 3.25. *Enterococcus faecium*. Percentage (%) of invasive isolates with resistance to vancomycin, by country, EU/EEA countries, 2014



Streptococcus pneumoniae (Makrolid R)

Figure 3.21. ***Streptococcus pneumoniae*. Percentage (%) of invasive isolates non-susceptible to macrolides, by country, EU/EEA countries, 2014**



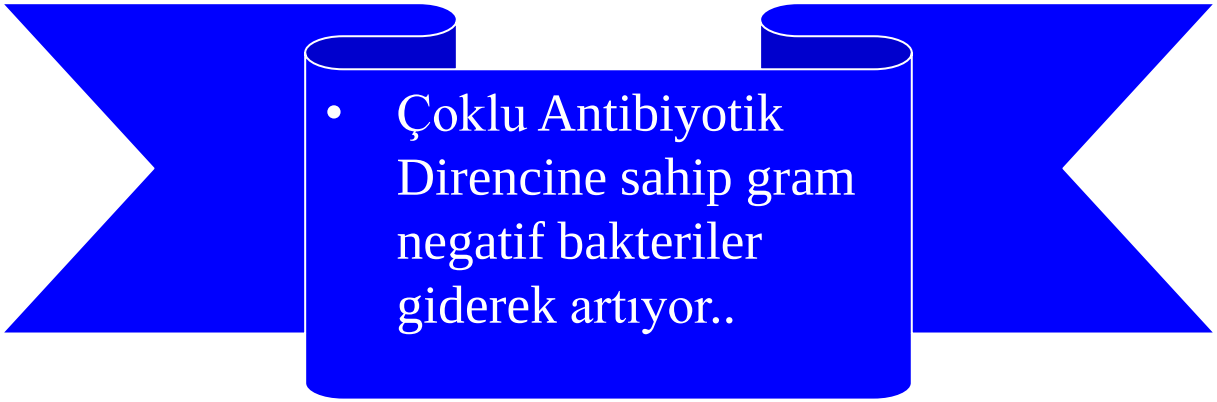
MDR İnfeksiyonları Önemli Sonuçlar Doğuruyor..

Değişken	S-KP (n=85)	ESBL-KP (n=65)	CRKP (n=42)	P
Hastane mortalitesi (%)	20 (24)	25 (39)	29 (69)	<0.001
İnfeksiyonla ilişkili mortalite (%)	14 (17)	14 (22)	20 (48)	0.001
İnf.sonrası hastanede yatış süresi, median gün (OR)	9 (16)	16 (34)	8 (22)	0.003
Total hastanede yatış süresi, median gün (OR)	21 (36)	36 (70)	37 (31)	0.001

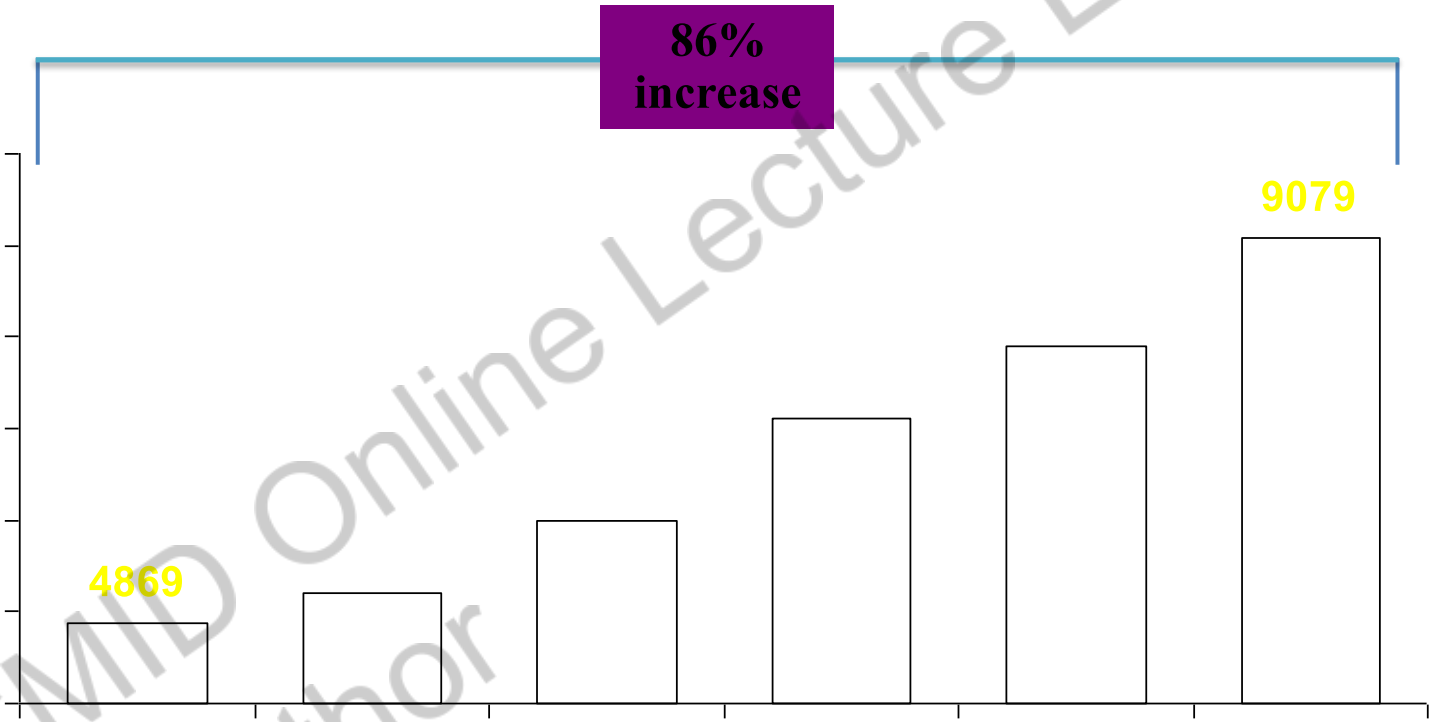
S-KP: Duyarlı *K.pneumoniae*, ESBL-KP: ESBL (+) *K.pneumoniae*, CRKP: Karbapeneme Dirençli *K.pneumoniae*

Ve bugün..

- Çoklu Antibiyotik Direncine sahip gram negatif
- Karbapeneme dirençli Enterik bakteriler
- Karbapeneme dirençli Pseuodomonaslar
- Karbapeneme dirençli Acinetobacter suşları
- Panrezistan gram negatifler..

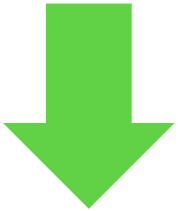


Karbapenem Kullanımı Giderek Artıyor



Dirençli Bakterilerin Kontrol Stratejisi

- Antibiyotik Yönetimi (Antibiotic Stewardship)



- Bakteriler arasında direnç gelişimini önleyici yaklaşım

- İnfeksiyon Kontrol Yöntemleri

- Dirençli bakterilerin hastalararası yayılımını önleyen yaklaşım

CDC NIH, 2010

Antibiyotik Yönetimi

- Tanım: Antibiyotiklerin kullanımı süresince AB seçimi, uygulanışı, dozu, tedavi süresi ve takibi gibi konularda veri toplanması ve bu veriler doğrultusunda kanıta dayalı akılcı AB kullanım politikalarının uygulanmasıdır.
- Amaç:
  - Uygunsuz ve yaygın AB kullanımının önlenmesi
  - İnfeksiyonlu hastalarda optimal tedavinin belirlenmesi ve tedavi sonuçlarına ait başarının artırılması

Ohl CA, Luther VP. J. Hosp. Med. 2011;6:S4
Dellit TH, et. al. Clin Infect Dis. 2007;44:159-177

Antibiyotik Kontrolü ve Önlemler

- Antibiyotik Kontrol Komitesi
- Rehberler ve tedavi protokolleri
- Geniş spektrumlu antibiyotiklerin kısıtlanm
- Dar spektrumlu antibiyotiklerin kullanımı
- İnfeksiyon Hastalıkları Uzman konsültasyonu

Antibiyotik Yönetiminin Temel 6 Hedefi

1. Antibiyotik kullanımının kontrol altına alınması ve uygunsuz AB kullanımının önlenmesi
2. *Clostridium difficile* infeksiyonlarının azaltılması
3. Hasta tedavi yanıtlarının artırılması
4. Tedavi rehberlerine uyumu artırmak
5. İlaç yan etkilerini azaltmak
6. AB direnç oranlarını kontrol altına almak ve düşürmek

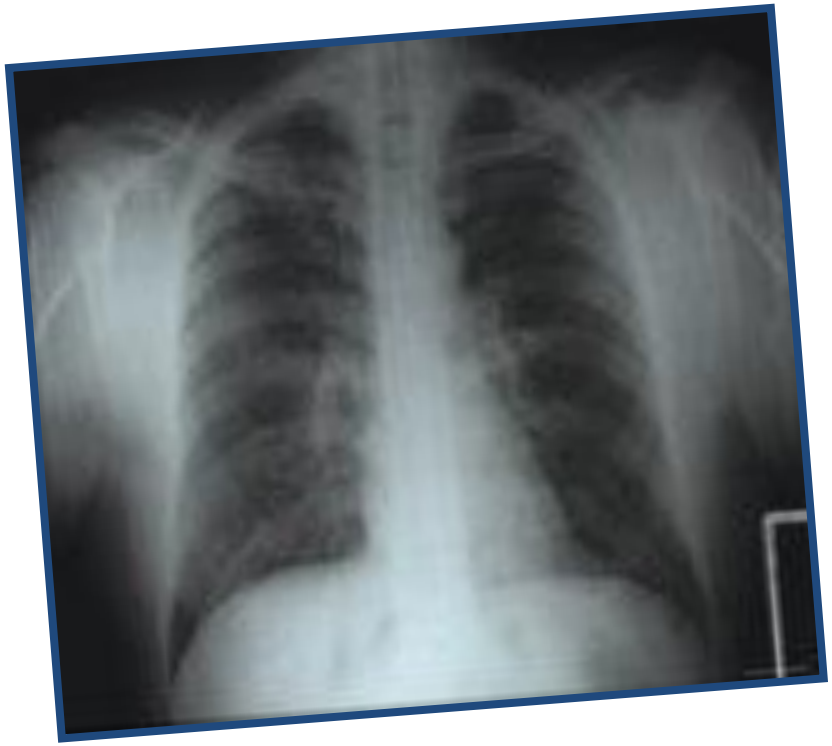
Tamma PD. Infect Dis Clin North Am. 2011

Hedef 1: Kolonizasyon Yerine Bakteri İnfeksiyonlarını Tedavi Et

- Birçok hasta patojen bakteri ile kolonize olduğu halde infeksiyon gelişmemiştir.
  - Asemptomatik bakteriüri ya da foley kateter kolonizasyonu
  - Kronik Solunum Yetmezliğinde trakeostomi kolonizasyonu
  - Kronik Yara ve dekübit ülseri
  - Alt ekstremitede staz ülserleri
  - Kronik bronşit
- Ayırımı zor olan durumlar
  - Lökosit varlığı infeksiyon için yeterli değildir
  - Pozitif kültür sonucu yoksa ateşin diğer nedenlerini de ara

Hedef 2: Steril İnflamasyonu ya da İnfeksiyon Dışı Anormal X-Ray Bulgularını AB ile Tedavi Etme

- TKP: Çoğunlukla tanısı zordur
- X-ray grafiyi yorumlamak zordur
- İnfiltrasyonlar infeksiyon dışı nedenle olabilir
- Örnekler:
  - Atelektazi
  - Malignite
  - Hemoraji
  - Pulmoner Ödem

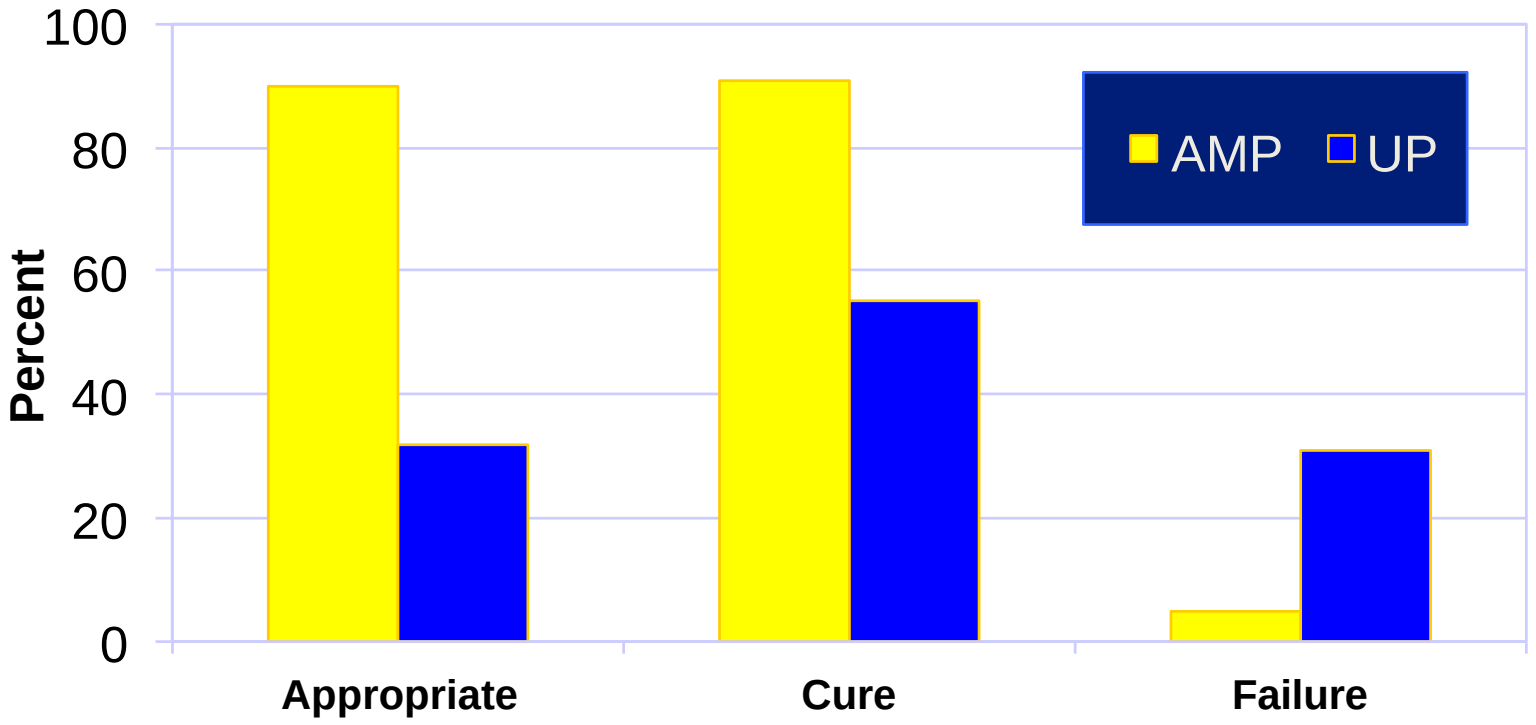


Hastanede Antibiyotik Kullanımının Sonuçları

- 3.Basamak bir hastanede 2010 yılında hastanede AB kullanım oranı %70
- Bunların yaklaşık %50'si gereksiz ya da uygunsuz AB
- Uygunsuz AB kullanımı sonucunda
  - İnfeksiyonların tedavi yetersizliği
  - Hastaneye ikinci yatışlarda artış
  - Maliyet artışı
  - MDR kolonizasyon artışı

Polk et al. In: PPID, 7th ed. 2010
Luther, Ohl. IDSA Abstract 2011

Antibiyotik Yönetimi Klinik Sonuçları Olumlu Etkiliyor..



AMP = Antibiotic Management Program
UP = Usual Practice

Fishman N. *Am J Med* 2006;119:S53

Antibiyotik Yönetimi ve Etkileri

- ABD'de iki YBU verileri (2001 ve 2008)
- *P.aeruginosa*, *A.baumannii*, ESBL (+) Enterikler
- %37.4 (2001) ve %8.5 (2008) MDR patojenler
- %34.1 (2001) ve %53.2 (2008) Duyarlı bakteri
- HI /1000 hasta günü: 0.78 / yıl azaldı

Dortch MJ, et al. Surg Infect, 2011

Obama Signs Health Care Overhaul Bill, With a Flourish

By SHERYL GAY STOLBERG and ROBERT PEAR MARCH 23, 2010

President Obama signed major health care legislation into law on Tuesday. Doug Mills/The New York Times

- Aynı dönemlerde ABD'de Ulusal Sağlık Reformu adımları atılıyordu..

Email

WASHINGTON — With the strokes of 22 pens, President Obama signed his landmark health care overhaul — the most expansive social legislation

MDR'li Olgu Saptandıktan Sonra Ne Yapılmalı?

- İnfeksiyon kaynağı ve olası bulaş yolunu belirle
  - Kurum içi olası her türlü kaynağı araştır (IA)
- Temas zincirini belirle ve izle (IA)
  - Hastanede 2-3 günlük bir gecikme ile en az 8-10 bulaş..
  - KIT, YBU gibi kritik yerlerde yüksek bulaş riski..
  - Temas izlemi şüpheli olgu nereye yatarsa yatsın yapılmalı, ya da hastanın tekrar hastaneye kabul edilişi ile başlatılmalıdır.
- Temas söz konusu olduğunda, geniş çaplı izlem oluştur ve negatif olguları da tekrar incele (inkübasyon periyodu) (IB)

The role of the healthcare environment in the spread of multidrug-resistant organisms: update on current best practices for containment

Ther Adv Infect Dis
(2014) 2(3–4) 79–90
DOI: 10.1177/2049936114543287

Roy F. Chemaly, Sarah Simmons, Charles Dale, Shashank S. Ghantoji, Maria Rodriguez, Julie Gubb, Julie Stachowiak and Mark Stibich

***Abstract*:** The role of the environment in harboring and transmitting multidrug-resistant organisms has become clearer due to a series of publications linking environmental contamination with increased risk of hospital-associated infections. The incidence of antimicrobial resistance is also increasing, leading to higher morbidity and mortality associated with hospital-associated infections. The purpose of this review is to evaluate the evidence supporting

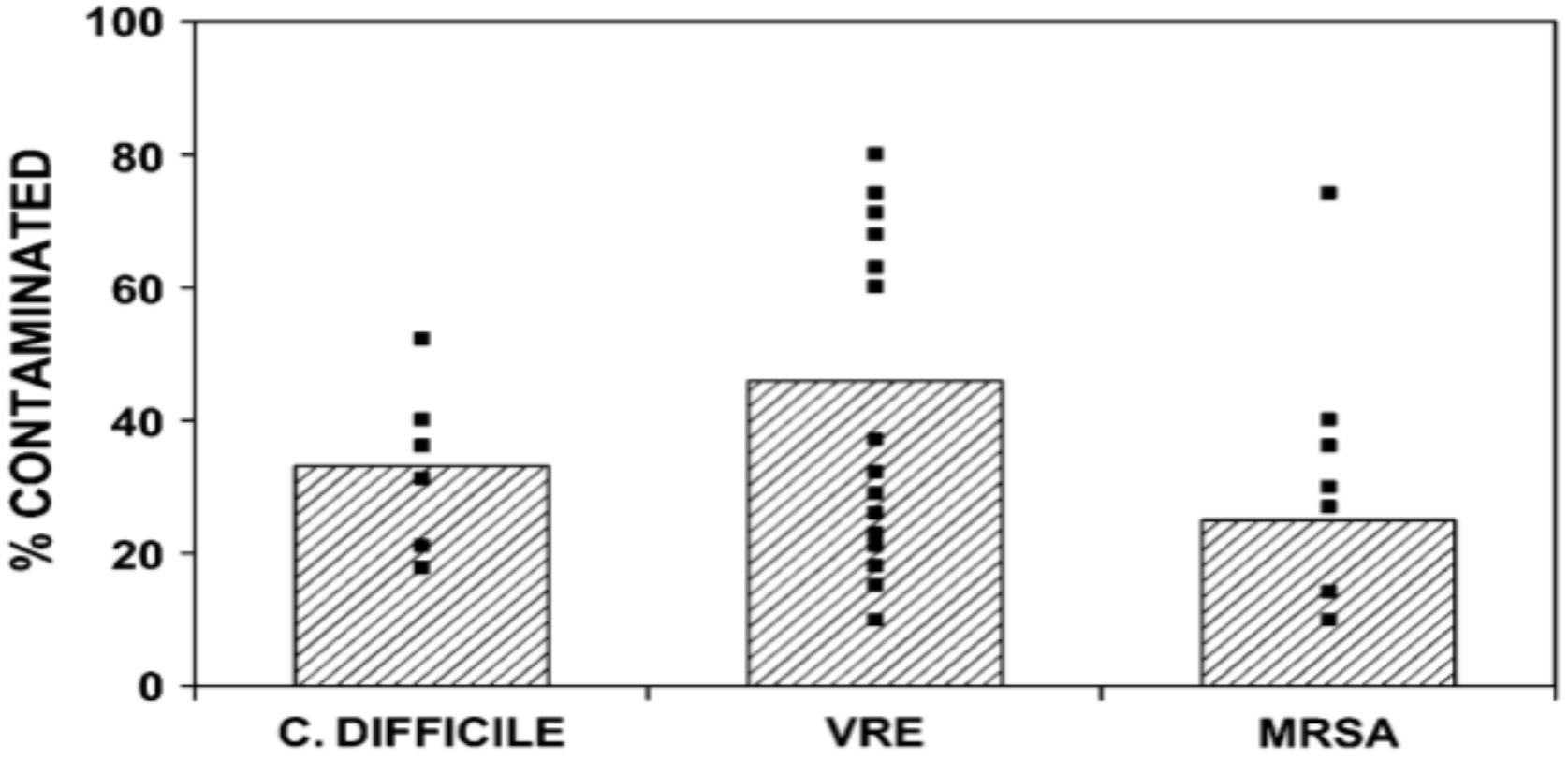
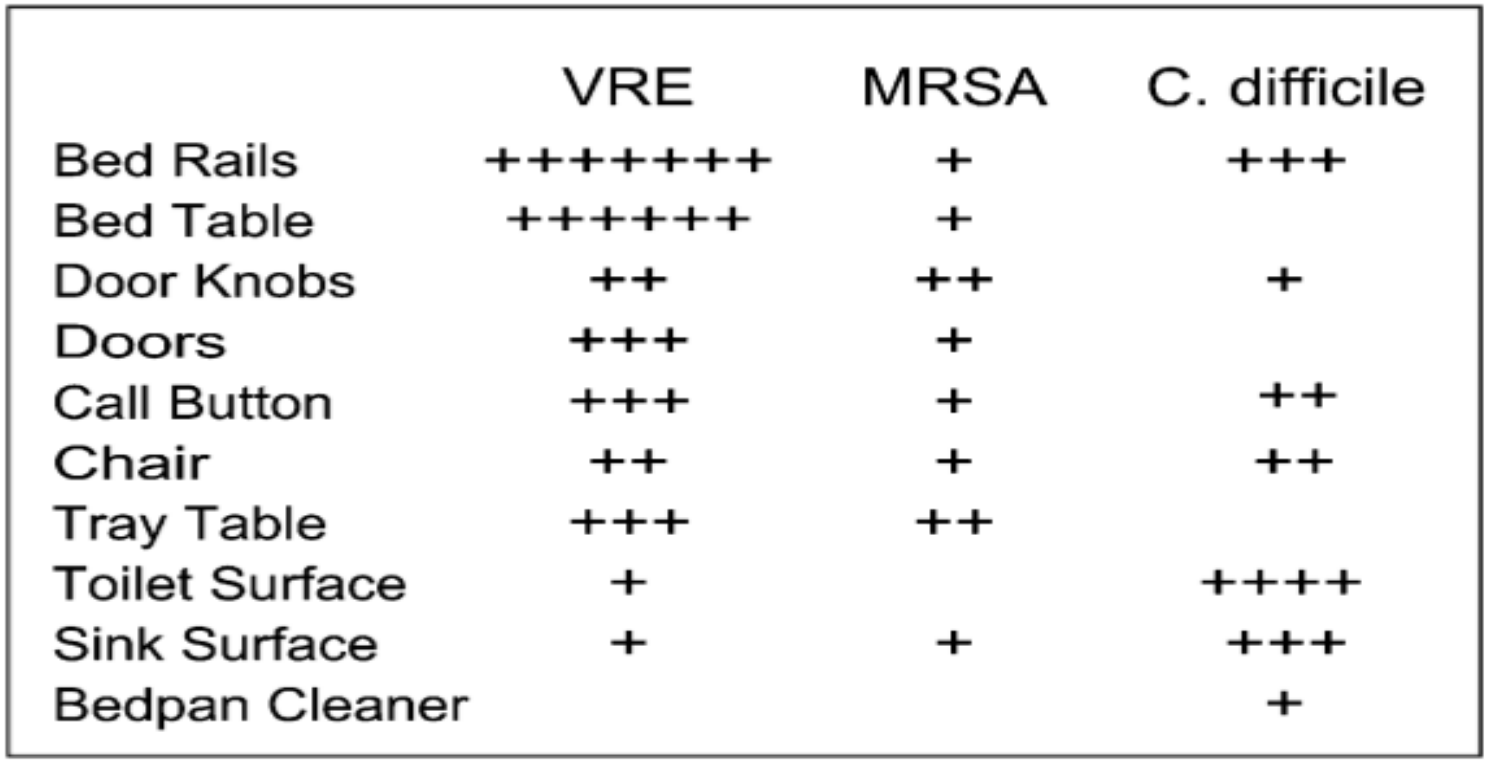


Fig 1. The proportion of environmental surface cultures positive for *C difficile*, VRE, and MRSA reported in the literature. Each point represents a separate study and the column, the mean for that pathogen.[26-47]



	VRE	MRSA	C. difficile
Bed Rails	+++++++	+	+++
Bed Table	++++++	+	
Door Knobs	++	++	+
Doors	+++	+	
Call Button	+++	+	++
Chair	++	+	++
Tray Table	+++	++	
Toilet Surface	+		++++
Sink Surface	+	+	+++
Bedpan Cleaner			+

Fig 2. The relative frequency with which surfaces in the near patient environment have been found to culture VRE, MRSA, and *C difficile*. Each + represents a single report in the literature.[19,21,26,27,30,31,33-36,39,40,42-44,46-49]

Hasta Yatak Çevresinde Bakterilerin Kolonizasyon Oranı

- Metisiline Dirençli *Staphylococcus aureus*

- %13 yatak çevresi kolonizasyonu
- French et al, 2004
-

- Vankomisine Dirençli Enterokok

- %43 yatak çevresi kolonizasyon
- Terminal dezenfeksiyon sonrasında da %16

[Trick et al. 2002].

Hastane Ortamında Bakterilerin Kalıcılık Süreleri

Organism	Survival time*	Prior room occupancy risk increase[$]
MRSA	7 days to >12 months	1.5
VRE	5 days to >46 months	2.25
Pseudomonas aeruginosa	6 h to 16 months	1.75
Clostridium difficile	>5 months (spores)	2.5
Acinetobacter baumannii	3 days to 11 months	3.5
CRE	19 days	
Norovirus (feline calicivurus)	8 h to 7 days	Limited data
Rotavirus	6–60 days	Limited data

Adapted from Kramer *et al.* [2006], Otter *et al.* [2013], and Havill *et al.* [2014].

*Survival times of multidrug-resistant organisms (MDROs) on dry inanimate objects. Range depends on experimental design and methods of assessing contamination.

[$]Ratio of increased risk associated with the room being previously occupied by patients infected with common MDROs.

Hastane Ortamında Dirençli Bakteri Kolonizasyonu

Bakteri	Kolonizasyon Oranı (%)		Kaynak
	Önceden Kolonizasyon (-)	Önceden Kolonizasyon (+)	
MRSA	2.9	3.9	Huang et al. 2006
Clostridium difficile	1	4.6	Shangnasy et al. 2011

MDR patojenlerde kolonizasyon riski %40 daha fazladır.

Türkiye'de Yapılan Çalışma Sonuçları

Kocaeli Üniversitesi Tıp Fakültesi Yoğun Bakım Ünitesi'nde Yatan Hastalardan İzole Edilen İnfeksiyon Etkenleri ve Antimikrobiyal Duyarlılıkları

Devrim Dündar[1], Meliha Meriç[2], Nur Baykara[3], Ayşe Willke[2] Klimik Dergisi • Cilt 21, Sayı:3 • 2008, s:122-125

Tablo 2. *A. baumannii* ve *P. aeruginosa*'nın Çeşitli Antibiyotiklere Duyarlılıkları (%)

Bakteri	PIP	PTZ	SS	CAZ	FEP	IMP	MEM	CIP	GM	TOB
A. baumannii (n=43)	13	15	33	14	31	29	30	17	17	29
P. aeruginosa (n=38)	36	43	58	44	44	56	65	64	56	63

PIP: Piperasilin, PTZ: Piperasilin/tazobaktam, SS: Sefoperazon/sulbaktam, CAZ: Seftazidim, FEP: Sefepim, IMP: Imipenem, MEM: Meropenem, CIP: Siprofloksasin, GM: Gentamisin, TOB: Tobramisin.

Tablo 4. Gram-Pozitif Bakterilerin Çeşitli Antibiyotiklere Duyarlılıkları (%)

Bakteri	Pen	OX	VM	EM	CIP	CLM	SXT	GM
Enterococcus spp. (n=18)	27	D	100	14	21	D	D	D
S. aureus (n=24)	0	68	100	67	67	67	100	67
KNS (n=8)	0	0	100	0	33	33	67	67

Türkiye'de Yapılan Çalışma Sonuçları

Kan Akımı İnfeksiyonlarından İzole Edilen *Pseudomonas aeruginosa* Suşlarının Antimikrobiyal Direnç Paterni: Altı Yıllık Değerlendirme

Klimik Dergisi 2013; 26(3): 108-12

Cem Çelik[1], Mustafa Gökhan Gözel[2], Elif Bilge Uysal[3], Mustafa Zahir Bakıcı[3], Esra Gültürk[4]

	Dirençli Suşlar (n=128)			
	Yoğun Bakım Ünitesi (72)		Servis (56)	
Antibiyotikler	Sayı	(%)	Sayı	(%)
Piperasilin-tazobaktam	7	(9.7)	1	(1.8)
Seftazidim	18	(25)	7	(12.5)
Sefepim	31	(43.1)	6	(10.7)
İmipenem	22	(30.6)	4	(7.1)
Meropenem	22	(30.6)	4	(7.1)
Siprofloksasin	11	(15.3)	5	(8.9)
Levofloksasin	18	(25.0)	8	(14.3)
Amikasin	2	(2.8)	-	-
Gentamisin	4	(5.6)	6	(10.7)
Aztreonam	46	(63.9)	18	(32.1)
Kolistin	2	(2.8)	-	-
Çok ilaca dirençli	5	(6.9)	(3.9)	-

	Dirençli Suşlar				
	2007-2010 (n=85)		2011-2012 (n=43)		
Antibiyotikler	Sayı	(%)	Sayı	(%)	*p*
Piperasilin-tazobaktam	4	(4.7)	4	(9.3)	0.441
Seftazidim	16	(18.8)	9	(20.9)	0.776
Sefepim	29	(34.1)	8	(18.6)	0.067
İmipenem	15	(17.6)	11	(25.6)	0.292
Meropenem	15	(17.6)	11	(25.6)	0.292
Siprofloksasin	7	(8.2)	9	(20.9)	0.040
Levofloksasin	16	(18.8)	10	(23.3)	0.556
Amikasin	1	(1.2)	1	(2.3)	0.998
Gentamisin	4	(4.7)	6	(14.0)	0.066
Aztreonam	35	(41.2)	29	(67.4)	0.005
Kolistin	0	-	2	(4.7)	0.111
Çok ilaca dirençli	2	(2.4)	3	(7.0)	0.334

Türkiye'de Yapılan Çalışma Sonuçları

2010-2015 Yılları Arasında Kan Kültürlerinde Üreyen Mikroorganizmalar ve Antibiyotik Duyarlılıkları

Birol Şafak, Osman Kılınç

Klimik Dergisi 2016; 29(2): 60-4

	Escherichia coli (n=303)							*Klebsiella* spp. (n=138)						
Antibiyotik	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Toplam**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Toplam**
AK	100	100	97.5	100	93.8	97.4	97.5	100	100	100	90.9	94.1	66.6	84.5
AMC	63.1	75	84.2	80	52.8	51.5	65.3	50	58.8	57.1	54.5	22.5	12.5	31.8
CAZ	75	66.6	67.5	75.5	71.6	68.1	70.8	66.6	72.2	57.1	36.3	32.3	18.5	33.8
CIP	73.6	66.6	51.4	47.8	60	61.8	58.9	88.8	94.1	100	90.9	63.6	50	68.1
CN	76	80.9	57.5	64.4	72.8	69.3	68.8	60	73.6	57.1	36.3	76.4	51.7	60.5
CRO	73	66.6	51.2	48.8	45.9	46.8	51	54.8	68.4	57.1	27.2	18.1	16.3	30.1
IPM	100	100	100	100	100	100	100	100	100	100	100	84.8	61.8	80.8
MEM	100	100	100	100	100	100	100	100	100	100	100	84.8	58.9	79.5
SXT	58.8	66.6	47.5	31.1	45.6	55.5	49.3	80	94.7	100	90.9	54.5	45.4	63.2
TZP	80.7	95.2	87.5	86.6	85.4	91.8	88	54.5	72.2	71.4	63.6	45.4	35.7	48.5

Türkiye'de Yapılan Çalışma Sonuçları

2010-2015 Yılları Arasında Kan Kültürlerinde Üreyen Mikroorganizmalar ve Antibiyotik Duvarlılıkları

Birol Şafak, Osman Kılınç

Klimik Dergisi 2016; 29(2): 60-4

	***Acinetobacter baumannii* (n=123)**							***Pseudomonas aeruginosa* (n=93)**						
Antibiyotik	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Toplam**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Toplam**
AK	71.5	80	100	90	21.8	44.7	55	100	76.4	92.3	77.7	100	91.3	90.3
CAZ	0	15.3	14.2	15	0	26.9	11.9	66.6	58.8	53.8	55.5	75	86.9	68.8
CIP	0	41.6	14.2	5	0	15.7	10.8	75	52.9	76.9	77.7	87.5	91.3	77.7
CN	20	58.3	42.8	35	3.2	36.8	28.5	81.8	70.5	92.3	77.7	93.7	91.3	85.3
COL	100	100	100	100	100	100	100	100	73.3	91.6	88.8	80	91.3	87.7
IPM	27.2	30.7	14.2	13.6	12.5	23.6	19.5	100	88.2	100	77.7	87.5	100	93.5
MEM	36.3	30.7	14.2	13.6	6.6	23.6	18.6	100	88.2	100	77.7	87.5	100	93.5
SXT	0	22.2	14.2	5.2	3.2	13.1	9.4							
TG	100	100	100	85.7	75	76.1	83.9							
TZP	0	10	14.2	10.5	0	28	15.2	84.6	56.2	30	77.7	100	95.6	78.8

UHESA Verileri

	MRSA	VRE
	%	%
2008	58.9	5.4
2009	58.5	6.1
2010	53.4	11.2
2011	55.3	17.1
2012	53.8	17.1

Ulusal Antimikrobiyal Direnç Sürveyans Sistemi

Klebsiella pneumoniae			
Yıllar	**GSBL (%)**	**Karbapenem R (%)**	**Kolistin R (%)**
2011	53.8		
2012	57.8		
2013	56	11	
2014	52	28	
2015	68	30	11

Ulusal Antimikrobiyal Direnç Sürveyans Sistemi

Pseudomonas aeruginosa				
Yıllar	**Pip+tazo R (%)**	**Sefepim R (%)**	**Karbapenem R (%)**	**Kolistin R (%)**
2011	22.7		21.2	
2012	25.2		22	
2013	27		33	
2014	21	15	24	
2015	30	26	32	2

Ulusal Antimikrobiyal Direnç Sürveyans Sistemi

Acinetobacter baumannii			
Yıllar	**Karbapenem R (%)**	**Kolistin R (%)**	**ÇİD (%)**
2014	89		66
2015	89	2	

Journal of Hospital Infection 91 (2015) 338–345

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin

Organization of infection control in European hospitals☆

S. Hansen [a,*], W. Zingg [b], R. Ahmad [c], Y. Kyratsis [d], M. Behnke [a], F. Schwab [a], D. Pittet [b], P. Gastmeier [a] on behalf of the PROHIBIT study group[†]

[a] *Charité – University Medicine Berlin, Institute for Hygiene, Germany*
[b] *University of Geneva Hospitals, Infection Control Programme, Switzerland*
[c] *Imperial College Healthcare NHS Trust, London, UK*
[d] *School of Health Sciences, City University London, UK*

ARTICLE INFO

Article history:
Received 29 April 2015
Accepted 22 July 2015
Available online 28 September 2015

Keywords:
Europe
Healthcare-associated infection prevention
Hospital

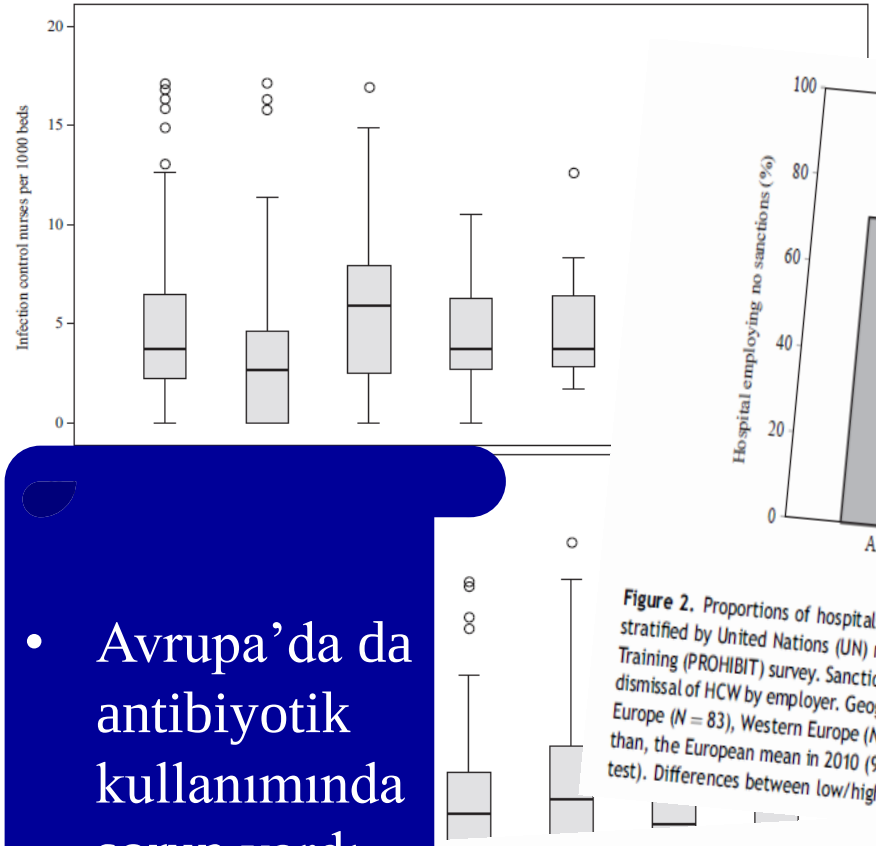
SUMMARY

Background: The Prevention of Hospital Infections by Intervention and Training (PROHIBIT) survey was initiated to investigate the status of healthcare-associated infection (HCAI) prevention across Europe.

Aim: This paper presents the methodology of the quantitative PROHIBIT survey and outlines the findings on infection control (IC) structure and organization including management's support at the hospital level.

Methods: Hospitals in 34 countries were invited to participate between September 2011 and March 2012. Respondents included IC personnel and hospital management.

Findings: Data from 309 hospitals in 24 countries were analysed. Hospitals had a median (interquartile range) of four IC nurses (2–6) and one IC doctor (0–2) per 1000 beds. Almost all hospitals (96%) had defined IC objectives, which mainly addressed hand hygiene (87%), healthcare-associated infection reduction (84%), and antibiotic stewardship (66%). Senior



- Avrupa'da da antibiyotik kullanımında sorun vardı..

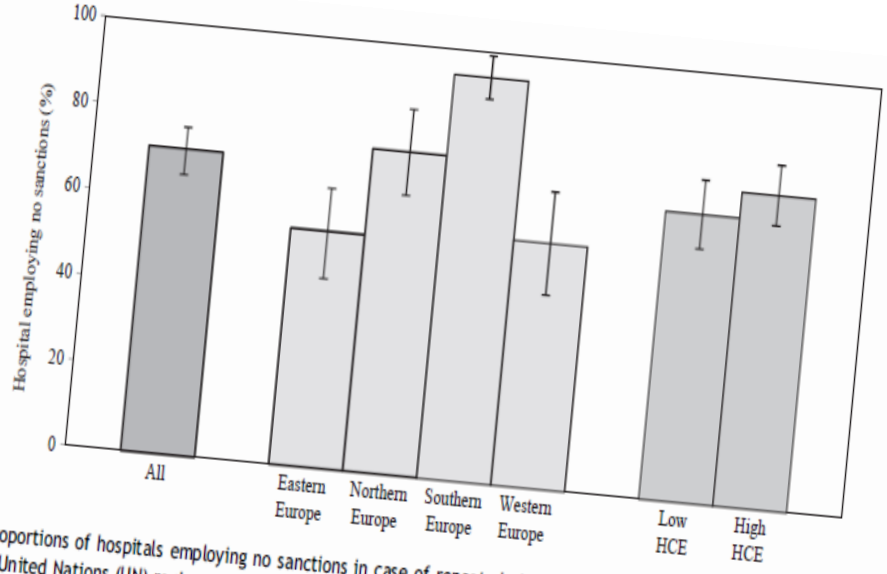


Figure 2. Proportions of hospitals employing no sanctions in case of repeated violation of infection prevention and control practices stratified by United Nations (UN) regions and healthcare expenditure (HCE) – The Prevention of Hospital Infection by Intervention and Training (PROHIBIT) survey. Sanctions were defined as: (i) review of healthcare worker (HCW) by supervisor; (ii) relocation of HCW; or (iii) dismissal of HCW by employer. Geographic regions according to UN grouping; Eastern Europe ($N = 88$), Northern Europe ($N = 73$), Southern Europe ($N = 83$), Western Europe ($N = 65$).[13] Low/high HCE defined as the share of the gross domestic product less or equal to, or greater than, the European mean in 2010 (9%); low HCE ($N = 135$), high HCE ($N = 174$).[14] Differences between UN regions, $P < 0.001$ (chi-square test). Differences between low/high HCE, $P = 0.286$ (chi-square test).

Figure 1. I
Th
(I
Nor

	All hospitals	Region[a]				Low HCE	High HCE
		Eastern Europe	Northern Europe	Southern Europe	Western Europe		
stablished (%)	66	65	70	59	72	64	68
Direct access to microbiology data[c,d] (%)	61	45	67	61	72	50	69

HCE, healthcare expenditure; IQR, interquartile range; IC, infection control; CEO, chief executive officer; ICN, infection control nurse; ICD, infection control doctor.

[a] Geographic regions according to United Nations (UN) grouping; Eastern Europe ($N = 88$), Northern Europe ($N = 73$), Southern Europe ($N = 83$), Western Europe ($N = 65$).[14]

[b] Low/high HCE defined as the share of the gross domestic product less or equal to, or greater than, the European mean in 2010 (9%); low HCE ($N = 135$), high HCE ($N = 174$).[15]

[c] Differences between UN regions: $P < 0.05$ (chi-square test).

[d] Differences between low/high HCE: $P < 0.05$ (chi-square test).

New Horizons for Pediatric Antibiotic Stewardship

Jennifer L. Goldman, MD, MS[a,b,*], Jason G. Newland, MD, MEd[c]

KEYWORDS

• Pediatrics • Antimicrobial stewardship • Antimicrobial resistance

KEY POINTS

- Inappropriate antimicrobial prescribing in pediatrics is common and the number of pediatric antimicrobial stewardship programs (ASPs) continues to grow.
- Many targets for pediatric ASP interventions differ compared with targets for adults due to differences in common diseases and prescribed antibiotics unique to children.
- Combating antimicrobial resistance is gaining recognition by government and policy makers, which reinforces the importance of stewardship.
- Collaborative efforts among ASPs nationally will continue to strengthen the approach to pediatric stewardship initiatives.

Infect Dis Clin N Am 29 (2015) 503–511

INTRODUCTION

Antimicrobial resistance is a major health threat resulting in at least 2 million illnesses and 23,000 deaths in the United States annually. The cause of antimicrobial resistance is multifactorial with the overuse and inappropriate use of antimicrobials contributing to the development of resistance. Unfortunately, the threat of bacterial resistance is

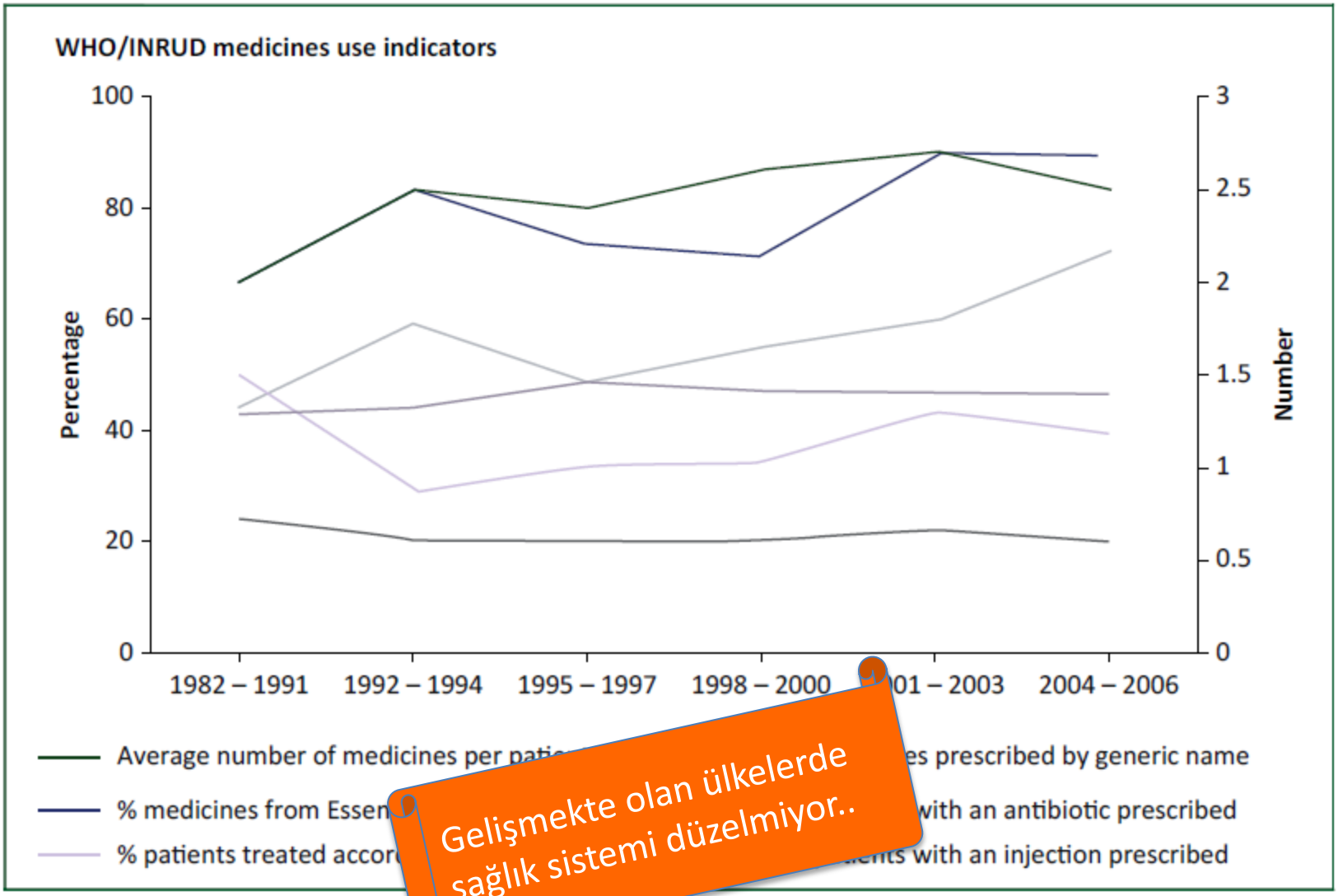


FIGURE 2. World Health ization (WHO) report on medicines use in primary care in developing and transitional countries over time, as reported in the *World Medicines Situation 2011* [48]. INRUD, International Network for the Rational Use of Drugs.

Antibiotic Use and Emerging Resistance

How Can Resource-Limited Countries Turn the Tide?

Lisa M. Bebell*,†, Anthony N. Muiru‡

Boston, MA, USA

GLOBAL HEART, VOL. 9, NO. 3, 2014
September 2014: 347-358

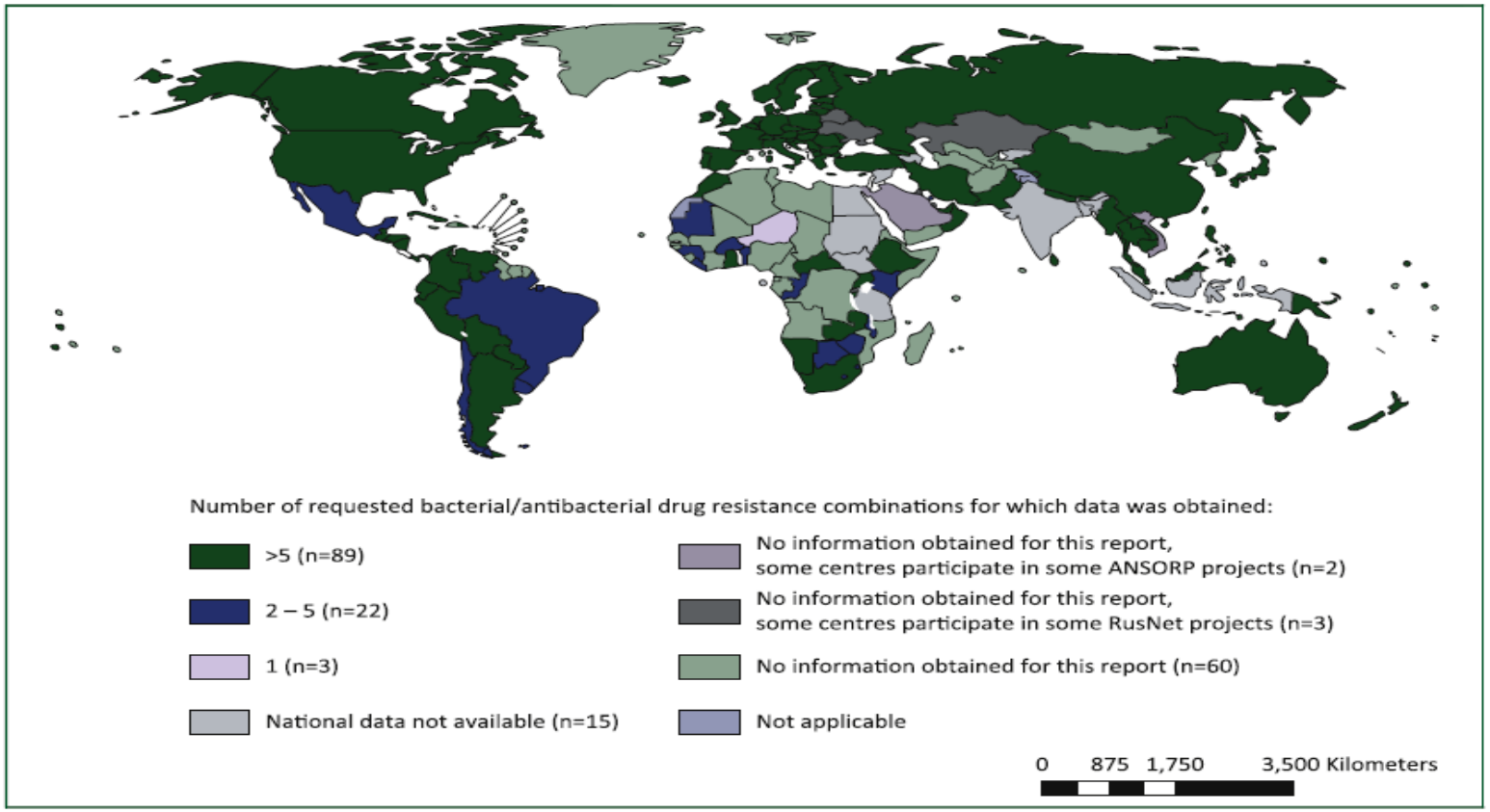


FIGURE 1. World Health Organization report on availability of data on resistance for selected bacteria-antibacterial drug combinations, 2013 [29]. Number of reported bacteria is based on the information obtained on the basis of request to national official sources on antibacterial susceptibility testing of ≥1 of the requested combinations, regardless of denominator data. Data from United Arab Emirates originate from Abu Dhabi only. ANSORP, Asian Network for Surveillance of Resistant Pathogens.

Mark Koba | @MarkKobaCNBC

Tuesday, 23 Apr 2013 | 7:33 AM ET

CNBC

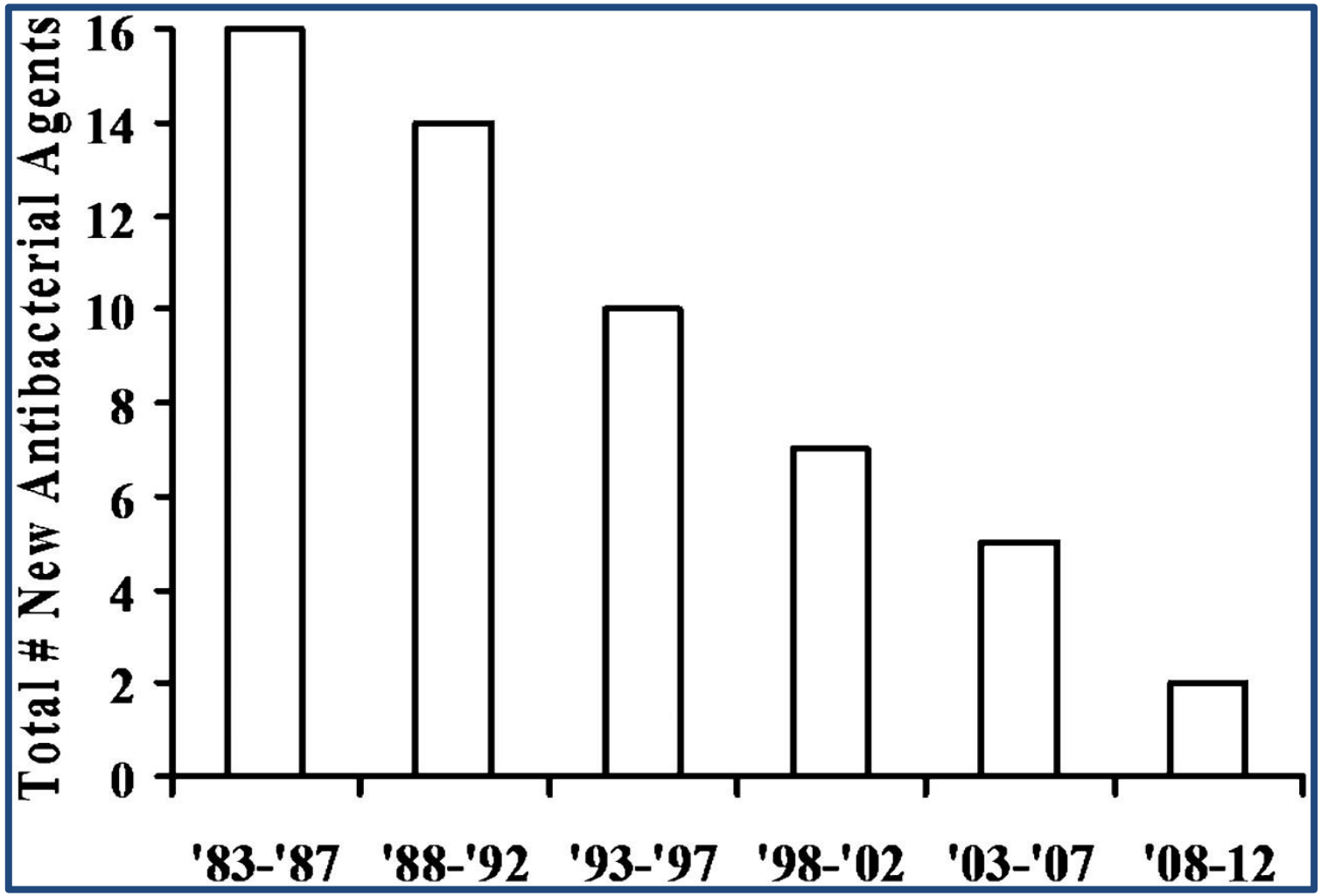
Olena Timashova | E+ | Getty Images

A looming shortage of antibiotic drugs threatens to derail efforts to fight the so called superbugs, according to a new report.

The Infectious Diseases Society of America, (IDSA) released a study last week stating that with just four of the big pharma firms researching

Yeni Antibiyotiklerin Tükenişi

FDA Tarafından Onay Alan Yeni Amtibiyotikler



Clin Infect Dis. 2011;52:S397-S428

- AB Direnci nedeniyle ..
- 20 milyar USD direkt
- 35 milyar USD dolaylı..
- GlaxoSmithKline, Pfizer
- Astra Zenaca, Merck

Superbugs are a 'Costly War We Can't Win'

- 190 milyon doz AB / gün
- 133 milyon reçete
- Yaklaşık %50’si gereksiz..


gettyimages
SAUL LOEB
467797592

Table of Contents

The Pres
S

Co-Chairs

John P. Holdren
Assistant to the President fo
Science and Technology
Director, Office of Science a
Policy

Vice Chairs

William Press
Raymer Professor in Comp
Integrative Biology
University of Texas at Aust

Members

Rosina Bierbaum
Dean, School of Natural R
ronment
University of Michigan

Christine Cassel
President and CEO
National Quality Forum

Christopher Chyba
Professor, Astrophysical
national Affairs
Director, Program on Sci
curity
Princeton University

14)

Ed Penhoet
Director, Alta Partners
Professor Emeritus, Biochemistry and Public Health
University of California, Berkeley

Barbara Schaal
Mary-Dell Chilton Distinguished Professor of Biology
Washington University, St. Louis

Eric Schmidt
Executive Chairman
Google, Inc.

Daniel Schrag
Sturgis Hooper Professor of Geology
Professor, Environmental Science and Engineering
Director, Harvard University Center for Environment
Harvard University

Table of Contents

TABLE 1: National Targets to Combat Antibiotic-Resistant Bacteria
By 2020, the United States will:
For CDC Recognized Urgent Threats:
Reduce by 50% the incidence of overall *Clostridium difficile* infection compared to estimates from 2011.
Reduce by 60% carbapenem-resistant Enterobacteriaceae infections acquired during hospitalization compared to estimates.
Maintain the prevalence of ceftriaxone-resistant *Neisseria gonorrhoeae* below 2% compared to estimates from 2013.
For CDC Recognized Serious Threats:
Reduce by 35% multidrug-resistant *Pseudomonas spp.* infections acquired during hospitalization compared to estimates from 2011.
Reduce by at least 50% overall methicillin-resistant *Staphylococcus aureus (*MRSA) bloodstream infections by 2020 as compared to 2011.*
Reduce by 25% multidrug-resistant non-typhoidal *Salmonella* infections compared to estimates from 2010-2012.
Reduce by 15% the number of multidrug-resistant TB infections.[1]
Reduce by at least 25% the rate of antibiotic-resistant invasive pneumococcal disease among <5 year-olds compared to estimates from 2008.
Reduce by at least 25%the rate of antibiotic-resistant invasive pneumococcal disease among >65 year-olds compared to estimates from 2008.

* This target is consistent with the reduction goal for MRSA bloodstream infections (BSI) in the *National Action Plan to Prevent Healthcare-Associated Infections (HAI): Road Map to Elimination,* which calls for a 75% decline in MRSA BSI from the 2007-2008 baseline by 2020. Additional information is available at http://www.health.gov/hai/prevent_hai.asp#hai_plan.

[1] The TB activities identified in the NAP are included as they represent critical near-term public health activities that will support progress to reduce the burden of drug-resistant TB in the U.S. Additional domestic and global activities to address drug-resistant TB will be provided in a companion action plan specific to TB and will be submitted to the President no later than September, 2015. The companion action plan will build on recommendations of the Federal TB Task Force (http://www.cdc.gov/mmwr/pdf/rr/rr5803.pdf) as well the work of the interagency USG TB working group.

TABLE 2: GOALS AND OBJECTIVES: Combating Antibiotic-Resistant Bacteria	
GOAL 1: Slow the Emergence of Resistant Bacteria and Prevent the Spread of Resistant Infections	
Objectives	
1.1	Implement public health programs and reporting policies that advance antibiotic-resistance prevention and foster antibiotic stewardship in healthcare settings and the community.
1.2	Eliminate the use of medically-important antibiotics for growth promotion in food- producing animals and bring other agricultural uses of antibiotics, for treatment, control, and prevention of disease, under veterinary oversight.
1.3	Identify and implement measures to foster stewardship of antibiotics in animals.
GOAL 2 : Strengthen National One-Health Surveillance Efforts to Combat Resistance Objectives	
2.1	Create a regional public health laboratory network to strengthen national capacity to detect resistant bacterial strains and a specimen repository to facilitate development and evaluation of diagnostic tests and treatments.
2.2	Expand and strengthen the national infrastructure for public health surveillance and data reporting, and wprovide incentives for timely reporting of antibiotic-resistance and antibiotic use in all healthcare settings.
2.3	Develop, expand, and maintain capacity in State and Federal veterinary and food safety laboratories to conduct antibiotic susceptibility testing and characterize select zoonotic and animal pathogens.
2.4	Enhance monitoring of antibiotic-resistance patterns, as well as antibiotic sales, usage, and management practices, at multiple points in the production chain for food animals and retail meat.
GOAL 3: Advance Development and Use of Rapid and Innovative Diagnostic Tests for Identification and Characterization of Resistant Bacteria	
Objectives	
3.1	Develop and validate new diagnostics—including tests that rapidly distinguish between viral and bacterial pathogens and tests that detect antibiotic-resistance—that can be implemented easily in a wide range of settings.
3.2	Expand availability and use of diagnostics to improve treatment of antibiotic-resistant infections, enhance infection control, and facilitate outbreak detection and response in healthcare and community settings.
GOAL 4: Accelerate Research to Develop New Antibiotics, Other Therapeutics, Vaccines, and Diagnostics	
Objectives	
4.1	Conduct research to enhance understanding of environmental factors that facilitate the development of antibiotic-resistance and the spread of resistance genes that are common to animals and humans.
4.2	Increase research focused on understanding the nature of microbial communities, how antibiotics affect them, and how they can be harnessed to prevent disease.
4.3	Intensify research and development of new therapeutics and vaccines, first-in-class drugs, and new combination therapies for treatment of bacterial infections.
4.4	Develop non-traditional therapeutics and innovative strategies to minimize outbreaks caused by resistant bacteria in human and animal populations.
4.5	Expand ongoing efforts to provide key data and materials to support the development of promising antibacterial drug candidates.

İnfeksiyon Kontrol Yöntemleri Network Sistemi

FIGURE 1. Distribution of Society for Healthcare Epidemiology of America Research Network members responding to the survey.

Choosing Wisely®

An initiative of the ABIM Foundation

SHEA
The Society for Healthcare Epidemiology of America

Five Things Providers and Patients Should Question

1 Don't continue antibiotics beyond 72 hours in hospitalized patients unless patient has clear evidence of infection.

Antibiotics are often started when a patient is possibly infected. After three days, laboratory and radiology information is available and antibiotics should either be deescalated to a narrow-spectrum antibiotic based on culture results or discontinued if evidence of infection is no longer present. Lessening antibiotic use decreases risk of infections with *Clostridium difficile (C. difficile)* or antibiotic-resistant bacteria.

2 Avoid invasive devices (including central venous catheters, endotracheal tubes and urinary catheters) and, if required, use no longer than necessary. They pose a major risk for infections.

Invasive devices are often necessary for patient support; however, they are a major risk for healthcare-associated infections (HAIs). We are learning they can often be avoided and, if used, can be quickly removed with the help of clinical reminders and protocols. They should never be used for convenience.

3 Don't perform urinalysis, urine culture, blood culture or *C. difficile* testing unless patients have signs or symptoms of infection. Tests can be falsely positive leading to overdiagnosis and overtreatment.

Although important for diagnosing disease when used in patients with appropriate signs or symptoms, these tests often are positive when an infection is not present. For example, in the absence of signs or symptoms, a positive blood culture may represent contamination, a positive urine culture could represent asymptomatic bacteriuria, and a positive test for *C. difficile* could reflect colonization. There are no perfect tests for these or most infections. If these tests are used in patients with low likelihood of infection, they will result in more false positive tests than true positive results, which will lead to treating patients without infection and exposing them to risks of antibiotics without benefits of treating an infection.

4 Don't use antibiotics in patients with recent *C. difficile* without convincing evidence of need. Antibiotics pose a high risk of *C. difficile* recurrence.

C. difficile can be a life threatening illness and is generally caused by antibiotics killing normal bacteria in the intestine. Patients recovering from *C. difficile* are three times as likely to have a recurrence if they receive an antibiotic in the following month. However, unnecessary antibiotics are often used in this population – primarily for misdiagnosed urinary tract infection or pneumonia.

5 Don't continue surgical prophylactic antibiotics after the patient has left the operating room.

Prophylactic antibiotics during surgery can significantly decrease the risk of surgical site infections; however, they only have benefit if used immediately around the time of surgery. When antibiotics are used for longer than necessary, they increase the risk of infection with antibiotic-resistant bacteria and *C. difficile*.

Choosing Wisely®

An initiative of the ABIM Foundation

SHEA
The Society for Healthcare Epidemiology of America

Five Things Providers and Patients Should Question

1

Hastaların yatışından 72 saat sonra halen infeksiyon kanıtları yetersizse antibiyotikleri kes

- Hastaların ilk yatışında çoğu merkezlerde antibiyotikler infeksiyon şüphesiyle başlanır. 72 saat sonra kültür sonuçlarına göre de-eskalasyon uygulanır ya da infeksiyonları klinik, laboratuar ve radyolojik bulguların desteklemediği hastalarda antibiyotikler kesilir. Bu hem dirençli patojenleri hem de *Clostridium difficile* infeksiyonlarını önler.

Choosing Wisely®

An initiative of the ABIM Foundation

SHEA
The Society for Healthcare Epidemiology of America

Five Things Providers and Patients Should Question

2

Santral ve üriner kateter ile endotrakeal tüp gibi invazif girişimlerden kaçın. Girişim yapılmış hastalarda en kısa sürede çıkarma çabası göster. İnvazif girişimlerin infeksiyon riskini artıran en önemli faktör olduğunu unutma..

- İnvazif girişimler hastaların tedavi desteğini sağlayan önemli unsurlardır. Gereksiz uygulamalar infeksiyon riskini artırmaktadır. Tedavi süresince hastalara önlem amacıyla invazif girişimler uygulanmamalı, gereksiz yere tutulmamalıdır.

Choosing Wisely®

An initiative of the ABIM Foundation

SHEA
The Society for Healthcare Epidemiology of America

Five Things Providers and Patients Should Question

3

Gereksiz yere idrar analizi, idrar kültürü, kan kültürü ya da *C.difficile* toksini bakma. Yalancı pozitif sonuçlar hatalı infeksiyon tanısı ve antibiyotik tedavisine neden olabilir.

- Tanı testleri semptom ve bulguları olan hastalarda önemli işlev görmekle birlikte, bazen normal hastalarda da yalancı pozitif sonuçlar verebilir. Kan kültürü kontaminasyon nedeniyle, idrar kültürü asemptomatik bakteriüri nedeniyle, *C.difficile* toksin taşıyıcılık nedeniyle pozitiif sonuçlanabilir. Bunların dikkate alınması ile hatalı tanı ve tedavi yapılacağından gereksiz istemlerden kaçınılmalıdır.

Choosing Wisely®

An initiative of the ABIM Foundation

SHEA
The Society for Healthcare Epidemiology of America

Five Things Providers and Patients Should Question

4 *C.difficile* için güçlü kanıtların olmadığı sürece antibiyotik kullanma. Gereksiz antibiyotik tedavisi *C. difficile* infeksiyonlarının artışına neden olabilir.

- *C.difficile* için klinik bulgular ve semptomlar olmadan elde edilen laboratuar sonuçlarını şüpheyle karşıla. Doğruluğundan şüphe duyduğun olgulara antibiyotik kullanma. Gereksiz antibiyotik kullanımı *C.difficile* kontrolü yerine artışına neden olabilir.

Choosing Wisely®

An initiative of the ABIM Foundation

SHEA
The Society for Healthcare Epidemiology of America

Five Things Providers and Patients Should Question

5

Cerrahi proflaksi hasta ameliyathaneden çıkmadan önce sonlandırılmalıdır.

- Cerrahi proflaksi uygun zamanda ve uygun dozda yapıldığında infeksiyon kontrolü açısından yararlı bir uygulamadır. Ancak uzamış cerrahi proflaksi antibiyotik direnç gelişimine ve *C.difficile* infeksiyonlarına neden olmaktadır.

GUIDELINES
Pocketcard

IDSA

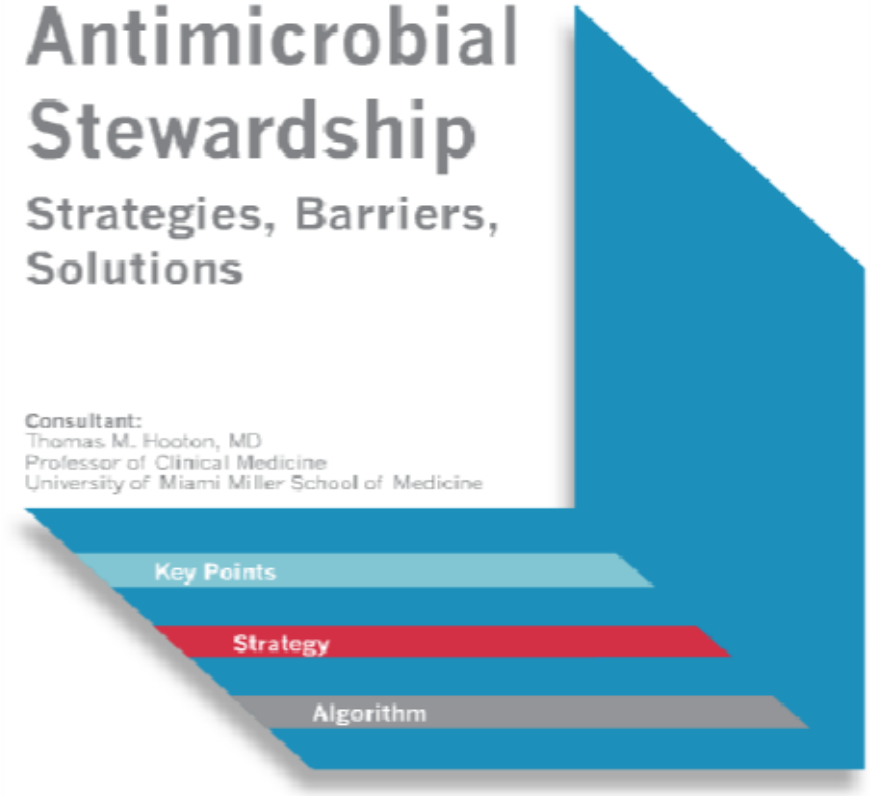
SHEA
The Society for Healthcare Epidemiology of America

Society of Infectious Diseases Pharmacists

Antimicrobial Stewardship

Strategies, Barriers, Solutions

Consultant:
Thomas M. Hooton, MD
Professor of Clinical Medicine
University of Miami Miller School of Medicine



GuidelineCentral.com®

2017 Presages Dramatic Change For Federal Health Care Policies

Republicans Are Likely to Face Hiccups Along th

Stephen Barla

Donald Trump's election as president poses a real challenge to elements of the U.S. health care policy will [illegible] but it is not yet clear whether the changes Des[illegible] resemble ripples in a pond. rep[illegible] that he would th[illegible]e, o[illegible]n, t[illegible]na, [illegible]ms, [illegible]rom [illegible]sional [illegible]e com- plete agenda [illegible]ges to Medicare and Medicaid as [illegible]uring of health insurance. Depending on the ext[illegible]to which

Stephen Barlas

bill ne[illegible] despite during [illegible] Amy Kl[illegible] authoriz[illegible]

Trump, GOP Lawmakers Back Off From Immediate Obamacare Repeal

February 6, 2017 · 12:40 PM ET

ALISON KODJAK

[illegible] during the campaign on his support for direct negotiation between Medicare and

Sonuç Olarak..

- Antibiyotik Yönetimi, akılcı kullanımı..
- Klorhekzidin banyosu
- Hasta izolasyonu
- Temas izolasyonu
- Kontrollü çevre temizliği
- El yıkama ve el dezenfektan kullanımı
- Sürveyans

> %90 MDR BAKTERİ KONTROLÜ..

Teşekkürler..