Strategia kontroli zakażeń w dobie narastającej oporności drobnoustrojów

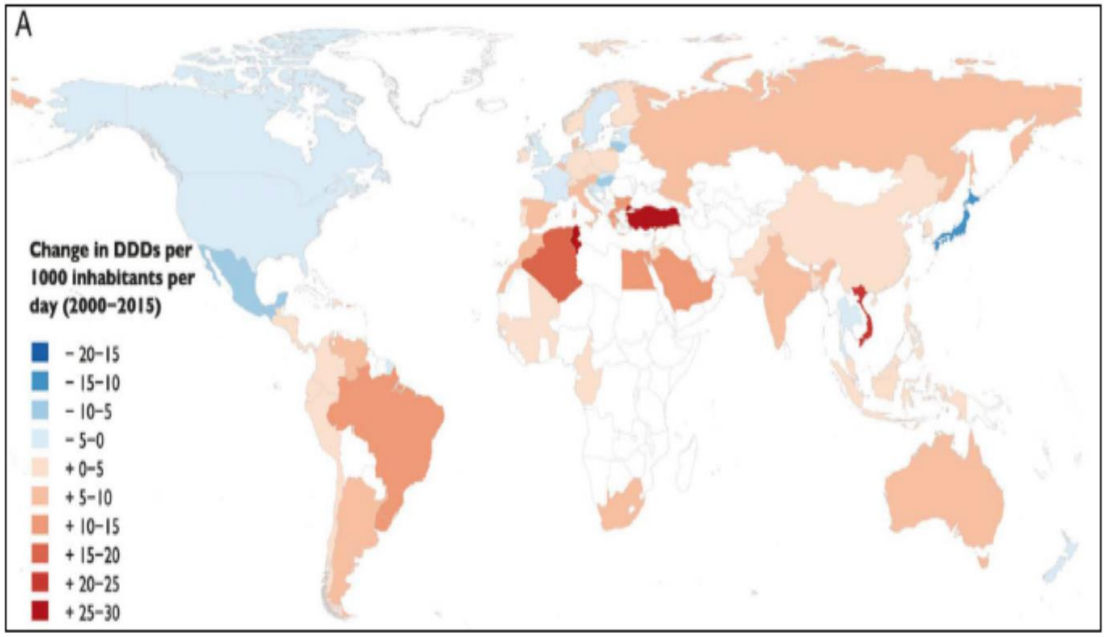
Jarosław Bakiera
WSS Lublin, COZL, PSK4

Lublin 26.11.2019

Global increase and geographic convergence in antibiotic consumption between 2000 and 2015

Eili Y. Klein[a,b,c,1], Thomas P. Van Boeckel[d], Elena M. Martinez[a], Suraj Pant[a], Sumanth Gandra[a], Simon A. Levin[e,f,g,1], Herman Goossens[h], and Ramanan Laxminarayan[a,f,i]

- 2000 -2015: Increase of antibiotic consumption by 65%

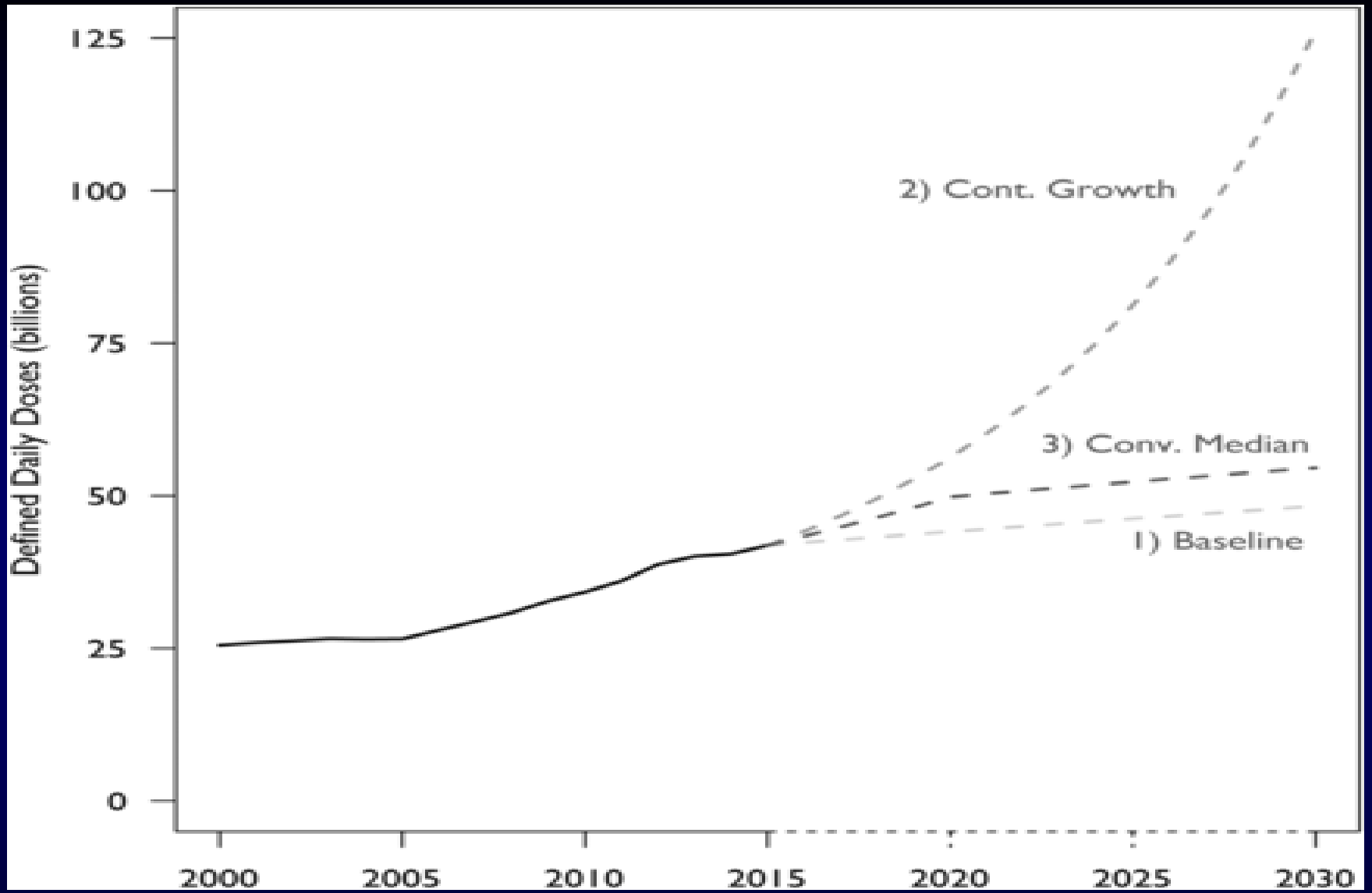


www.pnas.org/cgi/doi/10.1073/pnas.1717295115

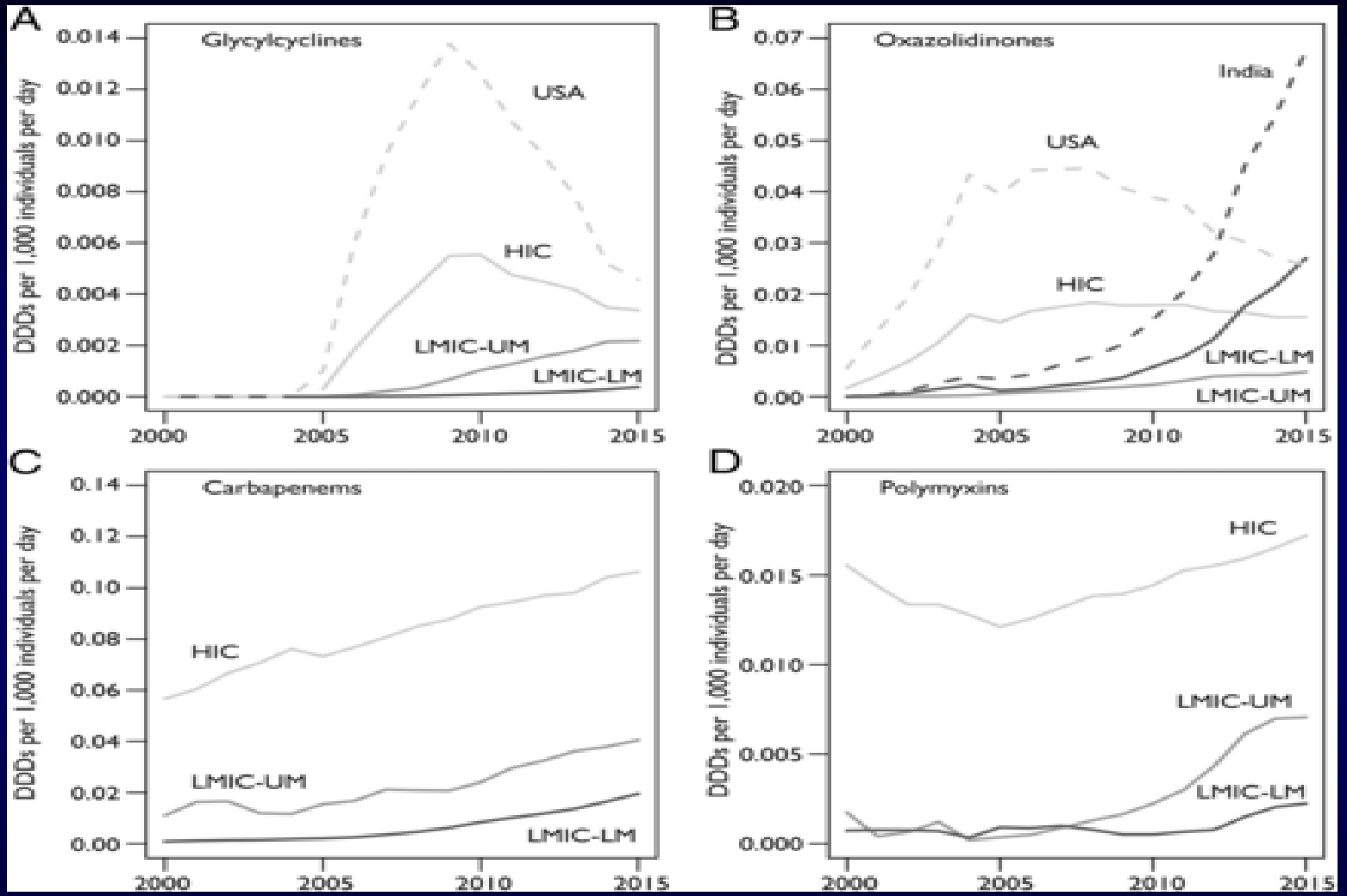
Pomiędzy 2000 a 2015 r wzrost zużycia ab o 65%

21,1–34,8 mld DDD

Wskaźnik spożycia antybiotyków wzrósł o 39% (11,3–15,7 DDD na 1000 mieszkańców dziennie

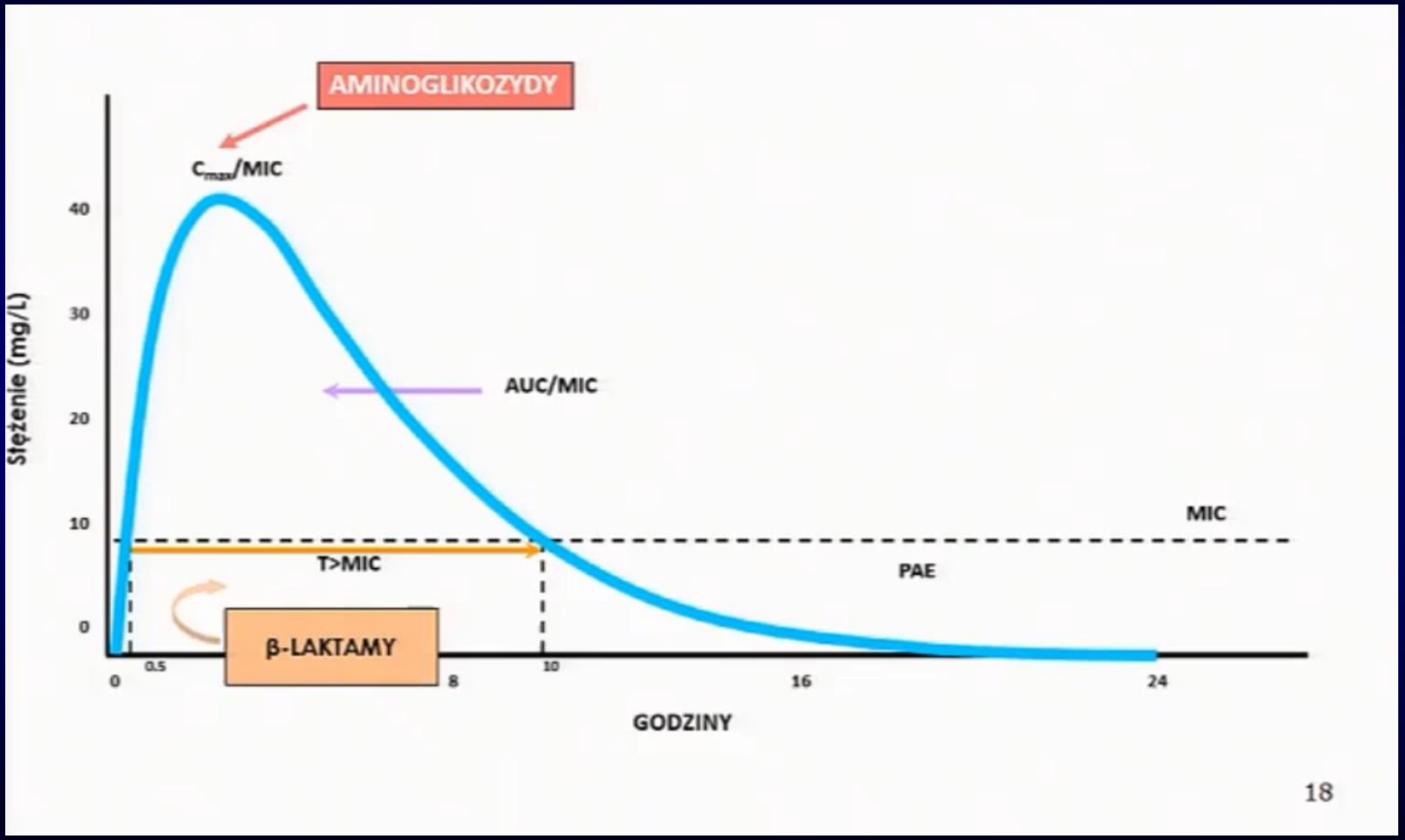


Projected total global antibiotic consumption (billions of DDDs): 2000–2030. Estimated global antibiotic consumption in all countries in billions of DDDs for three scenarios: (*i*) all countries continue to consume at current per capita rates; (*ii*) consumption of all countries continues to change at current compound annual growth rates; and (*iii*) all countries converge to the global median antibiotic consumption rate. Estimates were produced using antibiotic use data for 2000–2015 from the IQVIA MIDAS database and World Bank DataBank population estimates and projections for 2000–2030.



Antibiotic consumption rate for HICs, LMICs-UM, and LMICs-LM of new and last-resort antibiotics in DDDs per 1,000 inhabitants per day. (*A*) Glycylcyclines, which correspond to the ATC classification for tigecycline (J01AA12). (*B*) Oxazolidinones, which correspond to the ATC classifications for linezolid (J01XX08) and tedizolid (J01XX11). (*C*) Carbapenems, which correspond to the ATC classification for carbapenems (J01DH). (*D*) Polymyxins, which correspond to ATC classification for polymyxins (J01XB).

Farmakokinetyka antybiotyków



Clinical Infectious Diseases

EDITORIAL COMMENTARY

Short-course Antibiotic Therapy—Replacing Constantine Units With "Shorter Is Better"

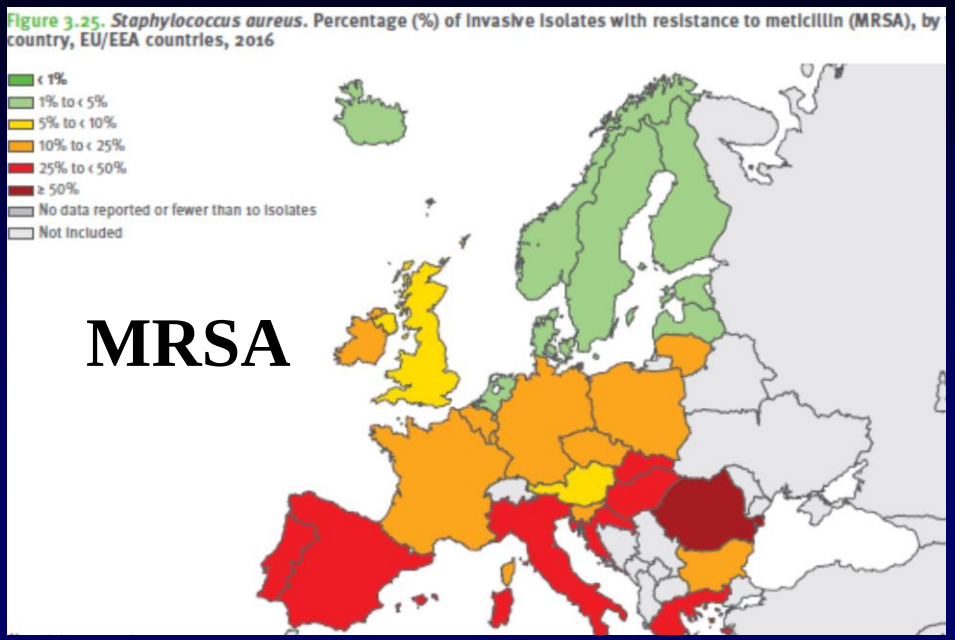
Noah Wald-Dickler[1,2] and Brad Spellberg[1,2]

Clinical Infectious Diseases® 2019;69(9):1476–9

Table 1. Diseases for Which Short-course Antibiotic Therapy Has Been Found to Be Equally Effective to Longer Traditional Courses of Therapy (With References)

Diagnosis	Short (d)	Long (d)	Result
Community-acquired pneumonia [6–14]	3 or 5	7, 8, or 10	Equal
Hospital-acquired/ventilator-associated pneumonia [15, 16]	7–8	14–15	Equal
Complicated urinary tract infections/pyelonephritis [17–22]	5 or 7	10 or 14	Equal
Complicated/postoperative intraabdominal infections [23, 24]	4 or 8	10 or 15	Equal
Gram-negative bacteremia [25]	7	14	Equal
Acute exacerbation of chronic bronchitis/chronic obstructive pulmonary disease (meta-analysis of 21 trials [26])	≤5	≥7	Equal
Acute bacterial skin and skin structure infections (cellulitis/major abscess) [27–29]	5–6	10	Equal
Chronic osteomyelitis [30]	42	84	Equal
Empiric neutropenic fever [31]	Afebrile and stable × 72 h	Afebrile and stable × 72 h and with absolute neutrophil count > 500 cells/μL	Equal

MRSA i VRE– EARS NET 2016



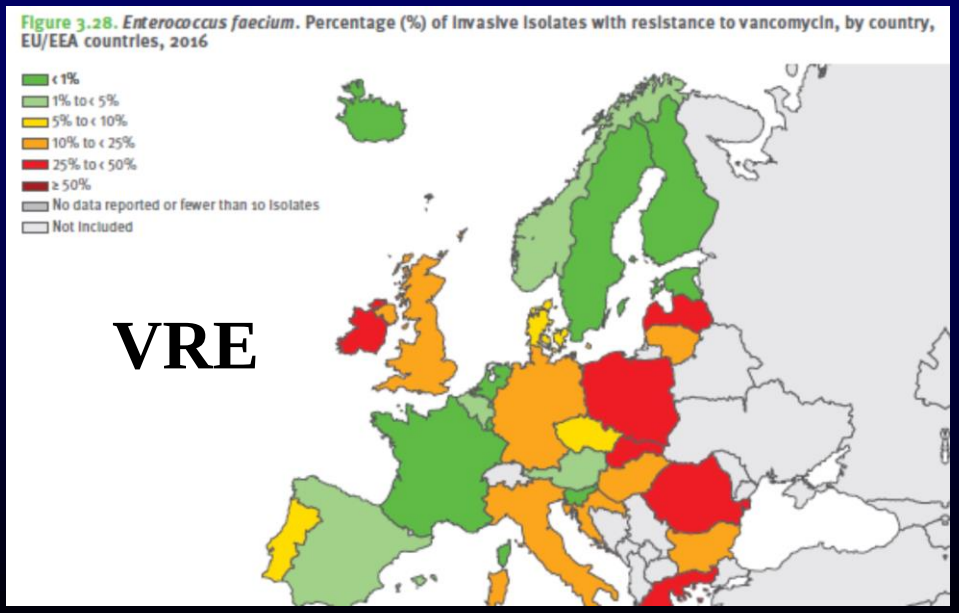
MRSA
2001: 15%

2016: 16%

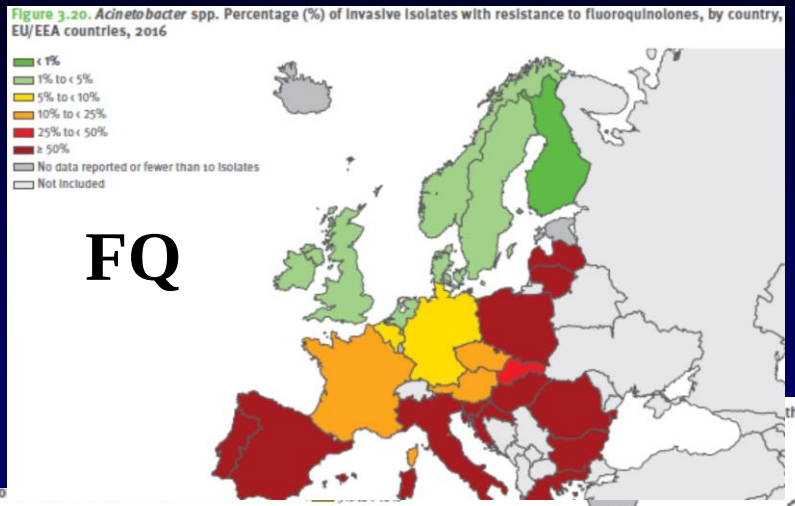
lubelskie 2017 ~ 15%

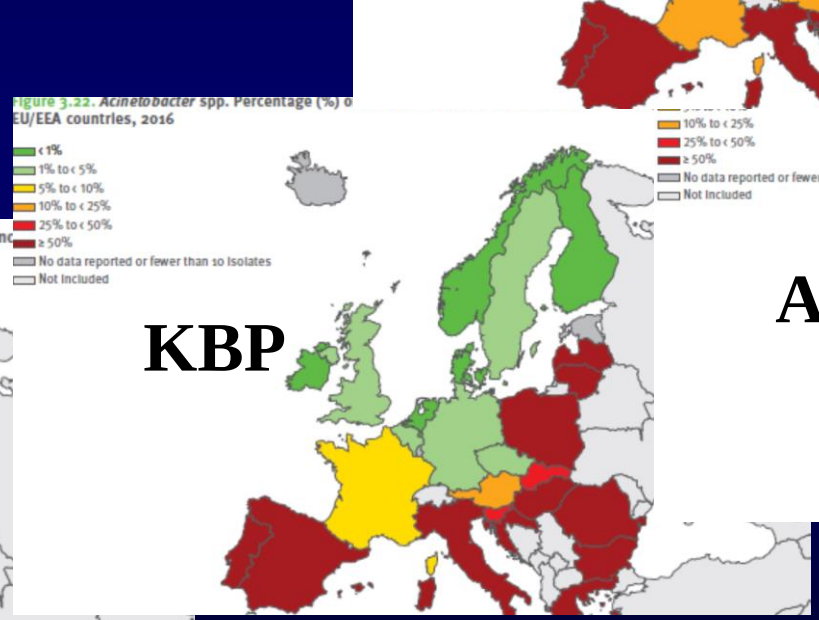
VRE
2001: <1%
2016: 25%

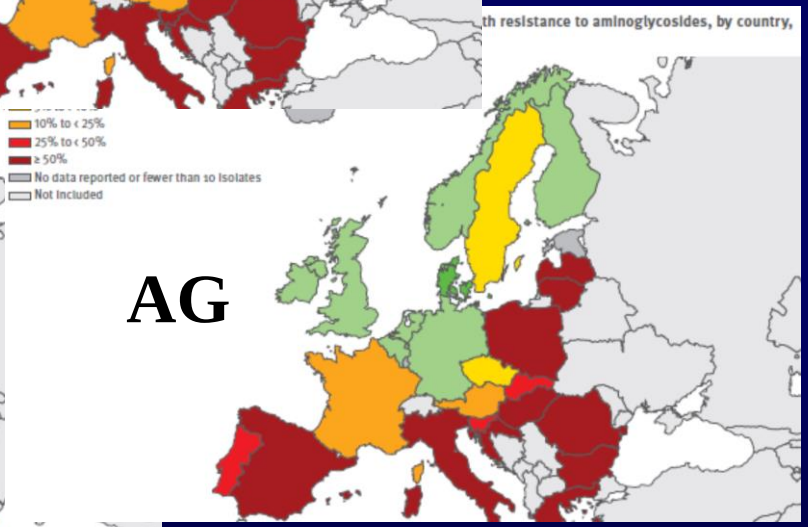
lubelskie 2017 ~ 20%

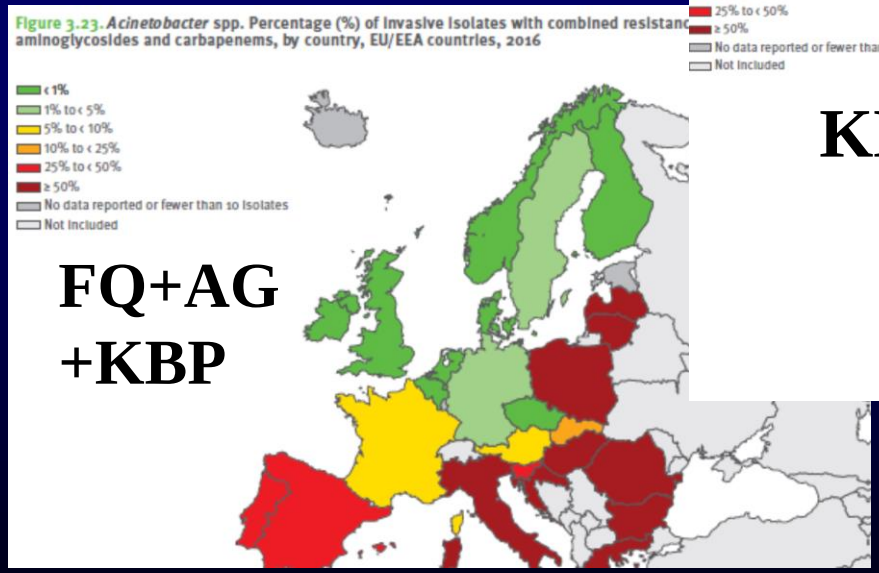


Aktualna oporność izolatów inwazyjnych *Acinetobacter* – EARS NET 2016









Etiologia VAP w Polsce w zal. od zastos. met dgn

Table 1 Microorganisms isolated in VAP depending on the employed method of taking the material for microbiological diagnostics, Polish ICUs 2013–2015

Min contam. sample + quant culture

VAP	PNEU-1[a]	Other VAP cases[b]	Total
Gram-positive cocci n(%)			35 (19.3)
Staphylococcus aureus	17 (21.3)	10 (9.9)	27 (16.1)
Coagulase-Negative Staphylococci	0 (0.0)	1 (1.0)	1 (0.6)
Enterococcus spp.	1 (1.3)	1 (1.0)	2 (1.2)
Streptococcus pneumoniae	4 (5.0)	1 (1.0)	5 (3.0)
Enterobacteriaceae n(%)			59 (32.6)
Citrobacter spp.	0 (0.0)	1 (1.0)	1 (0.6)
Enterobacter spp.	1 (1.3)	2 (2.0)	3 (1.8)
Escherichia coli	5 (6.3)	7 (6.9)	12 (7.1)
Klebsiella pneumoniae	17 (21.3)	16 (15.8)	31 (18.5)
Proteus spp.	2 (2.5)	4 (4.0)	6 (3.6)
Serratia spp.	5 (6.3)	1 (1.0)	6 (3.6)
Non-fermenting Gram-negative bacteria n(%)			50 (27.6)
Acinetobacter baumannii	10 (12.5)	24 (23.8)	34 (20.2)
Pseudomonas aeruginosa	8 (10.0)	2 (2.0)	10 (6.0)
Stenotrophomonas maltophilia	1 (1.3)	1 (1.0)	2 (1.2)
Hemophilus spp.	0 (0.0)	4 (4.0)	4 (2.4)
Other n(%)			37 (20.4)
Other bacteria	20 (25.0)	17 (16.8)	20 (22.0)
Total n(%)	80 (100.0)	101 (100.0)	181 (100.0)

BMC Infect Dis 2018

Leczenie zak. wywoł. przez Acinetobacter MDR, XDR

J Antimicrob Chemother 2018; **73**: 22–32
doi:10.1093/jac/dkx368 Advance Access publication 24 October 2017

Journal of Antimicrobial Chemotherapy

Comparative efficacy and safety of treatment options for MDR and XDR *Acinetobacter baumannii* infections: a systematic review and network meta-analysis

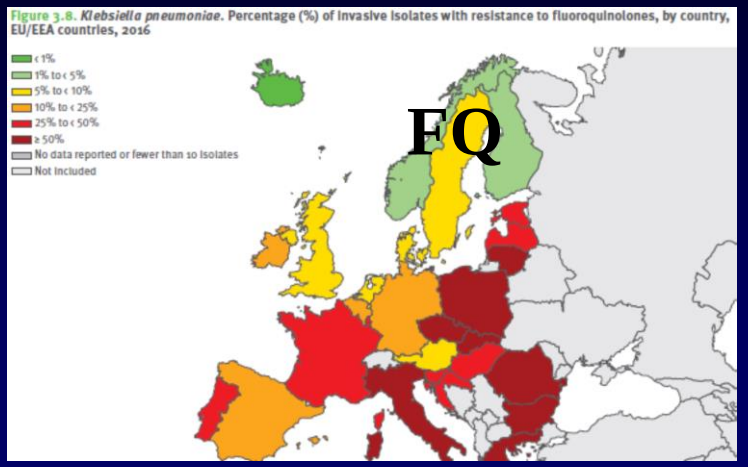
Kirati Kengkla[1], Khachen Kongpakwattana[2], Surasak Saokaew[1–3,6], Anucha Apisarnthanarak[4] and Nathorn Chaiyakunapruk[2,3,5,6*]

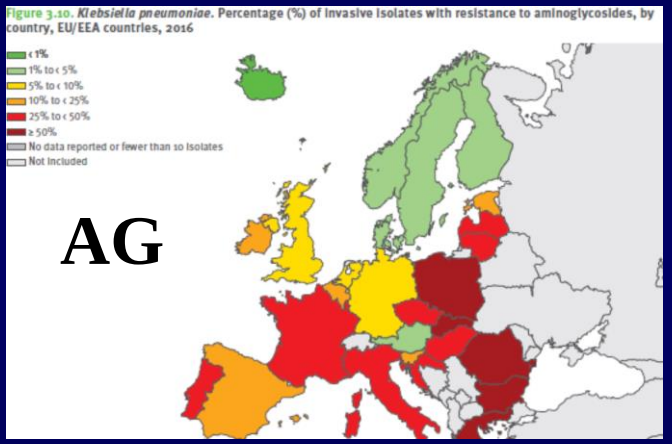
Ab potencjalnie akt wobec CRAB: COL, TGC, SUL, FOS (ew. AG, TMP/SMX, tetra)

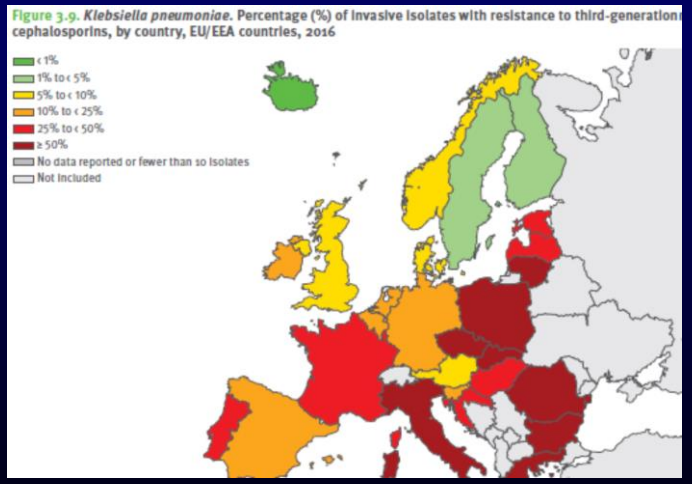
zalecana terapia skojarzona: zwykle COL + 1/2 ab aktywne (jeśli S): TIG, SUL, FOS, AG, ew. RIF lub karbap? (gdy niski MIC) - synergizm

Kolistyna w monoterpii – szybki rozwój oporności

Aktualna oporność izolatów inwazyjnych *K. pneumoniae* – EARS NET 2016







Cef3G

FQ +AG +Cef3G

KPC

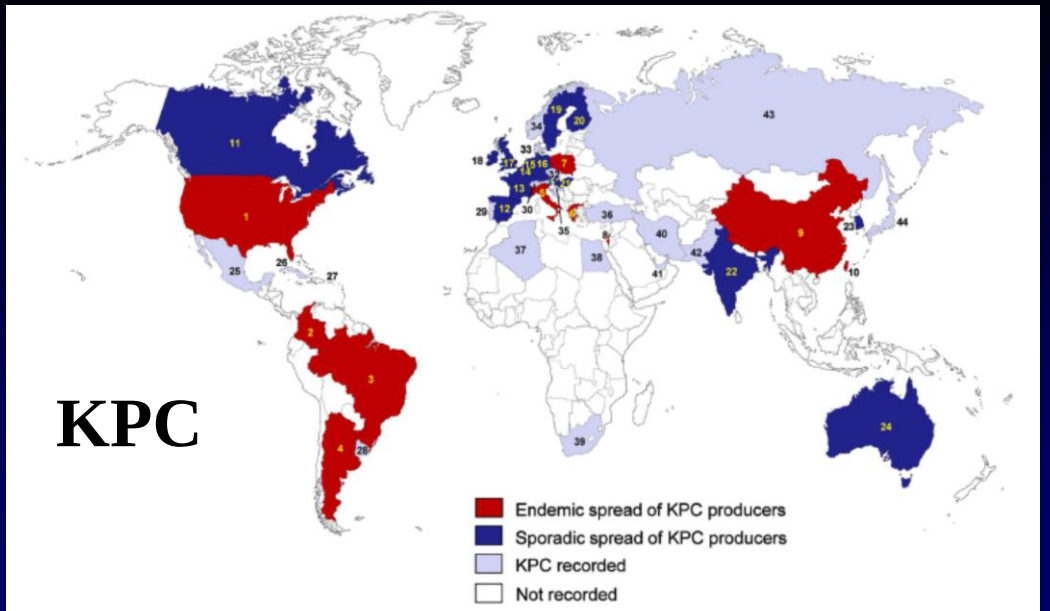


FIGURE 1 | Epidemiological features of KPC-producing *Klebsiella pneumoniae*. (1) USA; (2) Colombia; (3) Brazil; (4) Argentina; (5) Italy; (6) Greece; (7) Poland; (8) Israel; (9) China; (10) Taiwan; (11) Canada; (12) Spain; (13) France; (14) Belgium; (15) Netherlands; (16) Germany; (17) UK; (18) Ireland; (19) Sweden; (20) Finland; (21) Hungary; (22) India; (23) South Korea; (24) Australia; (25) Mexico; (26) Cuba; (27) Puerto Rico; (28) Uruguay; (29) Portugal; (30) Switzerland; (31) Austria; (32) Czech Republic; (33) Denmark; (34) Norway; (35) Croatia; (36) Turkey; (37) Algeria; (38) Egypt; (39) South Africa; (40) Iran; (41) United Arab Emirates; (42) Pakistan; (43) Russia; (44) Japan.

NDM

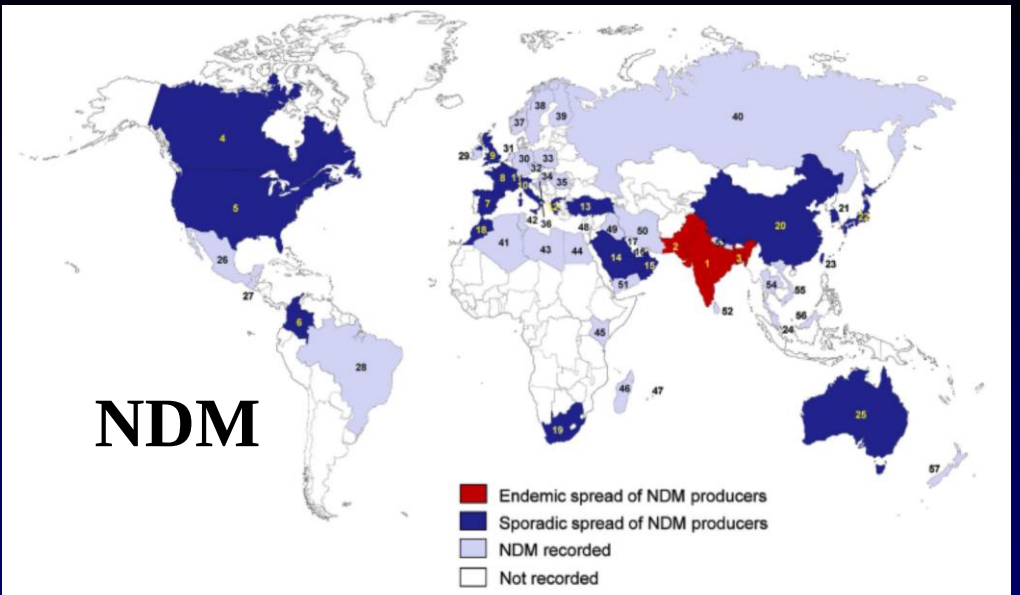


FIGURE 3 | Epidemiological features of NDM-producing *K. pneumoniae*. (1) India; (2) Pakistan; (3) Bangladesh; (4) Canada; (5) USA; (6) Colombia; (7) Spain; (8) France; (9) UK; (10) Italy; (11) Switzerland; (12) Greece; (13) Turkey; (14) Saudi Arabia; (15) Oman; (16) United Arab Emirates; (17) Kuwait; (18) Morocco; (19) South Africa; (20) China; (21) South Korea; (22) Japan; (23) Taiwan; (24) Singapore; (25) Australia; (26) Mexico; (27) Guatemala; (28) Brazil; (29) Ireland; (30) Germany; (31) Netherlands; (32) Czech Republic; (33) Poland; (34) Hungary; (35) Romania; (36) Croatia; (37) Norway; (38) Sweden; (39) Finland; (40) Russia; (41) Algeria; (42) Tunisia; (43) Libya; (44) Egypt; (45) Kenya; (46) Madagascar; (47) Mauritius; (48) Israel; (49) Iraq; (50) Iran; (51) Yemen; (52) Sri Lanka; (53) Nepal; (54) Thailand; (55) Vietnam; (56) Malaysia; (57) New Zealand.

OXA-48

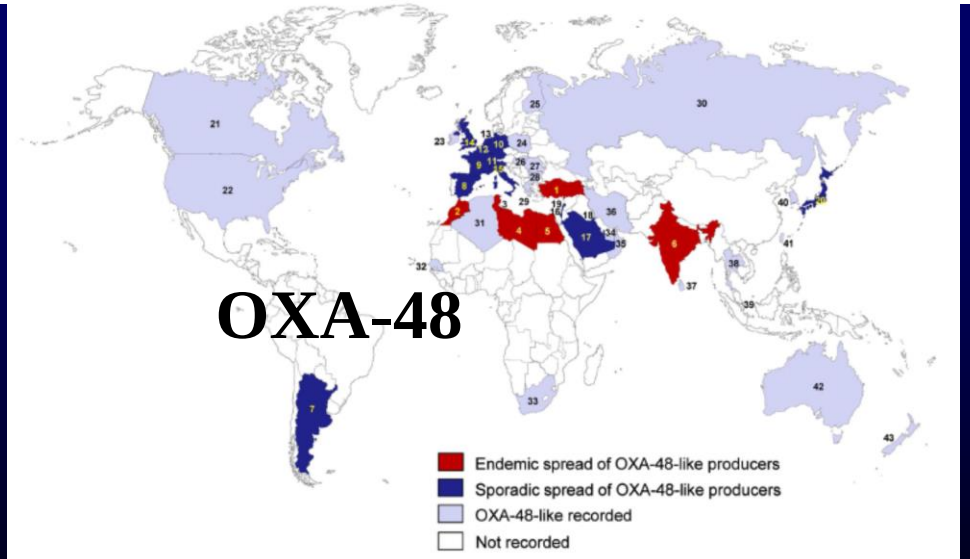


FIGURE 4 | Epidemiological features of OXA-48-like-producing *K. pneumoniae*. (1) Turkey; (2) Morocco; (3) Tunisia; (4) Libya; (5) Egypt; (6) India; (7) Argentina; (8) Spain; (9) France; (10) Germany; (11) Switzerland; (12) Belgium; (13) Netherlands; (14) UK; (15) Italy; (16) Israel; (17) Saudi Arabia; (18) Kuwait; (19) Lebanon; (20) Japan; (21) Canada; (22) USA; (23) Ireland; (24) Poland; (25) Finland; (26) Hungary; (27) Romania; (28) Bulgaria; (29) Greece; (30) Russia; (31) Algeria; (32) Senegal; (33) South Africa; (34) United Arab Emirates; (35) Oman; (36) Iran; (37) Sri Lanka; (38) Thailand; (39) Singapore; (40) South Korea; (41) Taiwan; (42) Australia; (43) New Zealand.

Ch.Lee 2016

CPE

Wysoka śmiertelność (25-50%)

-metaanaliza,2462 pacjentów z zakażeniami CPE

54% zakażania łożyska krwi

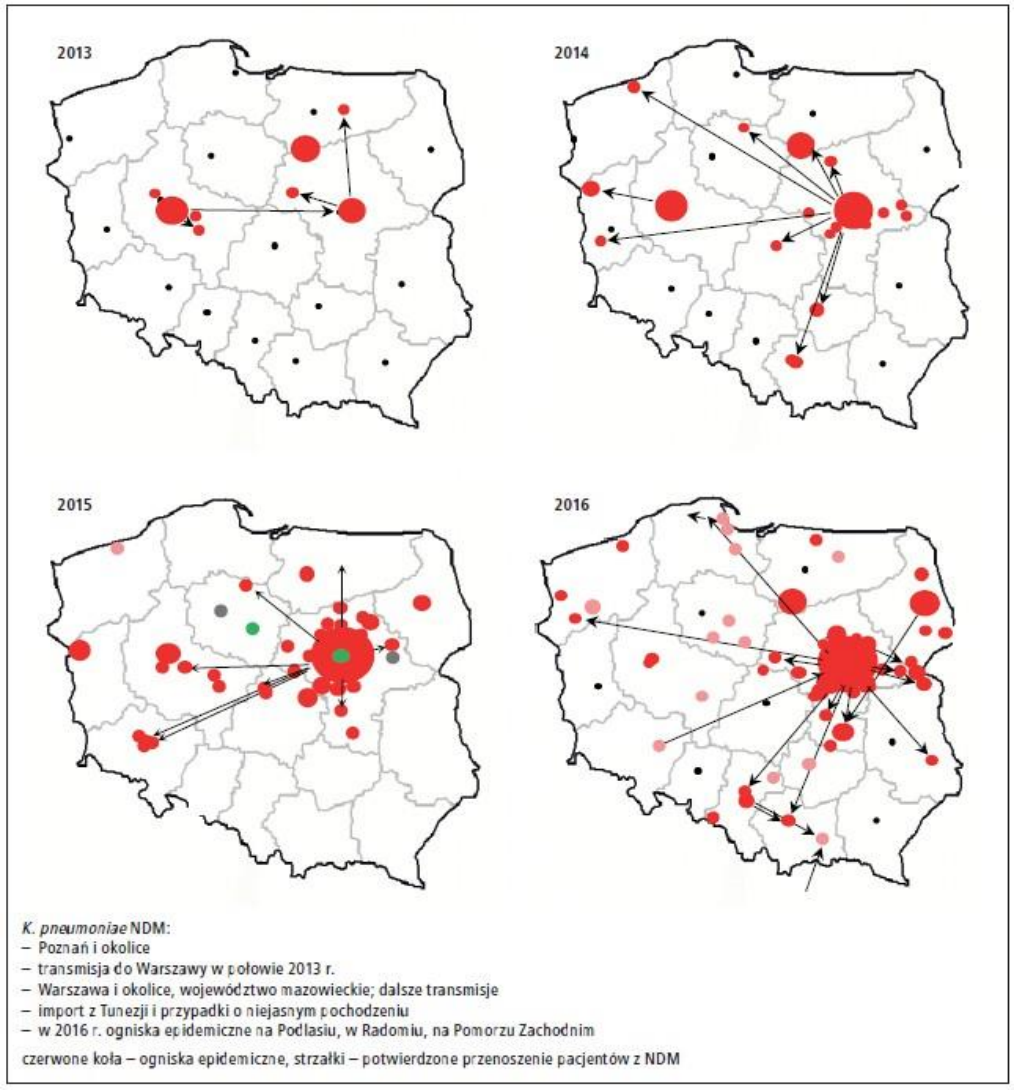
13% zakażenia dróg moczowych

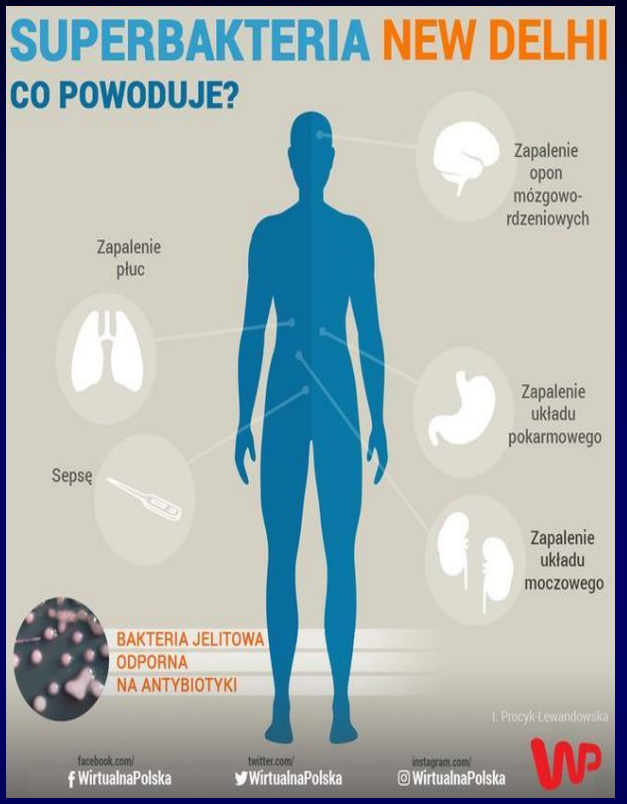
Utrzymywanie się nosicielstwa CPE

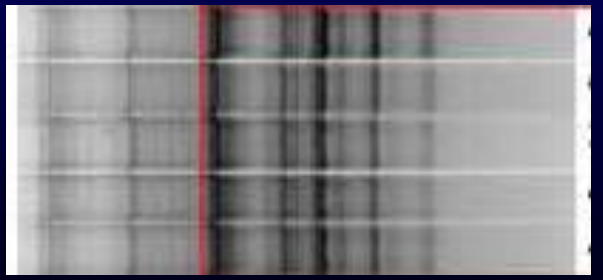
- Lubbert i wsp. American Journal of Infection Control 2014
  - Wyniki wymazów wykonywno u pacjentów do 2 lat po epidemii KPC
  - Badania wykonywano u 84 pacjentów
  - Za wynik CPE negatywny – uznawano 3 negatywne wyniki w odstępach 48 godzin
  - Stwierdzono: **31% negatywnych wyników po upływie 1 miesiąca**
  - 74% po upływie 1 roku
  - 83% po upływie 2 lat
  - U 2 pacjentów otrzymano wyniki pozytywne, po wcześniejszych 3 neg. wynikach
  - **Najdłuższe nosicielstwo powyżej 3 lat**

- Zimmerman i wsp. American Journal of Infection Control 2013 – **39% pozytywnych wyników po upływie 1 roku**
- Feldman et al.CMI 2012 - <**30% pozytywnych wyników po upływie 6 msc po wypisie ze szpitala**

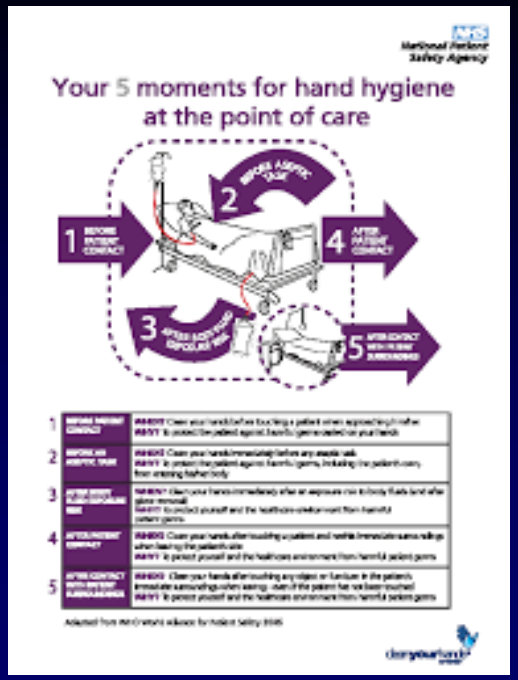
Era postantybiotykowa







Dlaczego?



Bare Below the Elbows

Hand hygiene is the single most important measure for preventing the spread of infection

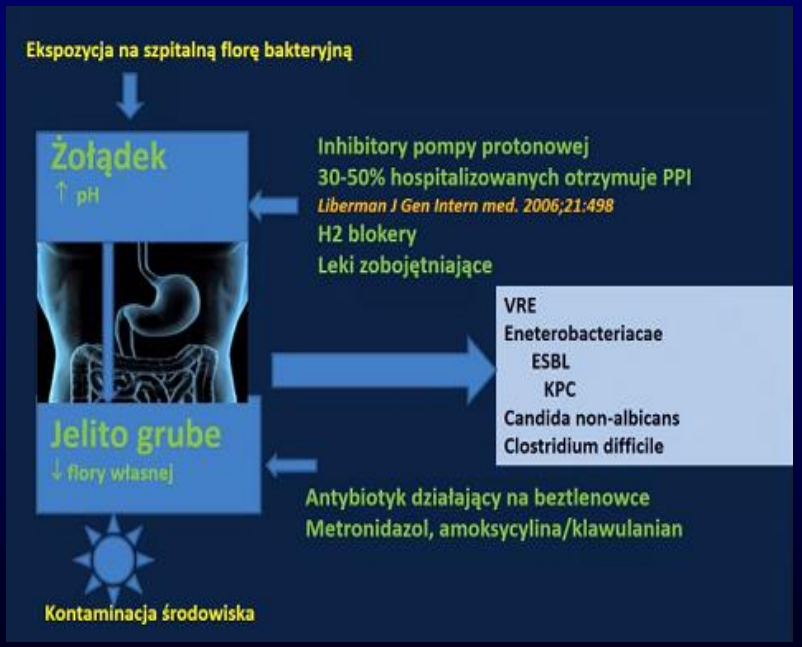
Best practice to facilitate good hand hygiene when delivering direct care to service users is to be 'Bare Below the Elbows' this includes:

- Being free from long-sleeved clothing (long sleeves, if worn, should be rolled or pushed up to the elbows)
- Removing hand and wrist jewellery (a plain band ring may be worn)
- Keeping nails short and clean
- Not wearing false or gel nails or nail polish and nail jewellery
- Covering cuts and abrasions with a waterproof dressing

Bare Below Elbows

Giving Hygiene a Helping Hand!

Results of December 2016 audit showed 82% compliance with BBE hospital policy
Target is 90% by March 2017
TOGETHER WE CAN DO IT - PLEASE PLAY YOUR PART



Leczenie zak. wywoł. przez CPE - terapia celowana w oparciu o MIC

Terapia skojarzona

MIC meropenemu ≤ 8-16 mg/L:
meropenem + 1 lub 2 inne aktywne antybiotyki
MER: 2 g LD w ciągu 1 h, nast. 2g (lub więcej) CI w ciągu 6 h co 8 godz. +
np. TG: 200 mg LD, nast. 100 mg co 12 h i/lub
COL 9 MU LD, nast. 4,5 MU co 12 godz. (3 MU co 8 h) i/lub
AMIK 20 mg/kg co 24 godz.

MIC meropenemu > 16 mg/L, kolistyna S:
kolistyna + 1 lub 2 inne aktywne antybiotyki

MIC meropenemu > 16 mg/L, kolistyna R:
2 lub 3 z aktywnych: tygecyklina, AG, ryfampicyna, fosfomycyna
lub
ertapenem + meropenem

Aktywność nowych ab wobec MDR

Table 1. Spectrum of activity of new antibiotics for ventilator-associated pneumonia against multidrug-resistant pathogens

	MRSA	ESBL	CRE-KPC	CRE-OXA48	CRE-MBL	MDR pseudomonas	MDR acinteobater
Tedizolid	Yes	No	No	No	No	No	No
Cefiderocol	No	Yes	Yes	Yes	Yes	Yes	Yes
Ceftaroline/avibactam	Yes	Yes	Yes	Yes	**No**	**No**	No
Ceftolozane/tazobactam	No	Yes	No	No	No	Yes	No
Ceftazidime–avibactam	No	Yes	Yes	Yes	No	Yes	No[a]
Meropenem–vaborbactam	No	Yes	Yes	No	No	No[a]	No[a]
Imipenem–relebactam	No	Yes	Yes	No	No	No[a]	No[a]
Aztreonam–avibactam	No	Yes	Yes	Yes	Yes	Yes	No
Plazomicin	Yes	Yes	Yes	Yes	Yes[b]	Yes	No
Eravacyclin	Yes	Yes	Yes	Yes	Yes	No	Yes
Murepavadin	No	No	No	No	No	Yes	No

CRE, carbapenem-resistant Enterobacteriacae; ESBL, extended-spectrum beta-lactamase; MBL, metallo-β-lactamase; KPC, *Klebsiella pneumoniae* carbapenemase; MDR, multidrug-resistant; MRSA, methicillin-resistant *Staphylococcus aureus*; NDM, New Delhi metallo-betalactamase; OXA, oxacillinase.

[a]Actives against no MDR-resistant strains.

[b]Not active against many NDMs.

Curr Opinion Infect Dis 2018

Dziękuję za uwagę