Current Situation & Challenges of Antimicrobial-resistant Bacteria in Indonesia

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AMR Control Committee - MoH
Faculty of Medicine, Universitas Indonesia

National action plan on AMR 2020-2024

https://www.who.int/indonesia/news/publications/other-documents/national-action-plan-on-antimicrobial-resistance-control--2020-2024

Strategic objectives

1. Raising the awareness and understanding of AMR control through communication, education, and training
2. Improving scientific knowledge and evidence through surveillance and research
3. Reducing the incidence of infection through sanitation, hygiene, as well as prevention and control infection
4. Optimizing, supervising, and enforcing follow up sanctions against the distribution and use of non-standard antimicrobials in humans, animals, fish and plants
5. Increasing spending on medical treatment governance, diagnostic methods, and new vaccines to reduce the growing issues of antimicrobial resistance, and
6. Developing integrated governance and coordination to control antimicrobial resistance

Regulations about AMR in Human Sectors

MOH Regulation No. 8/2015 AMR Control Program in Hospital

MENTERI KESEHATAN REPUBLIK INDONESIA

PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA
NOMOR 8 TAHUN 2015

TENTANG

PROGRAM PENGENDALIAN RESISTENSI ANTIMIKROBA DI RUMAH SAKIT

DENGAN RAHMAT TUHAN YANG MAHA ESA

MENTERI KESEHATAN REPUBLIK INDONESIA,

MOH Decree No. 6460/2021 National AMR Control Committee 2017-2019

MENTERI KESEHATAN REPUBLIK INDONESIA

KEPUTUSAN MENTERI KESEHATAN REPUBLIK INDONESIA
NOMOR HK.01.07/MENKES/6460/2021
TENTANG
KOMITE PENGENDALIAN RESISTENSI ANTIMIKROBA

DENGAN RAHMAT TUHAN YANG MAHA ESA

MENTERI KESEHATAN REPUBLIK INDONESIA,

renewed: 2021

MOH Regulation No.28/2021 Antibiotics Use Guideline

MENTERI KESEHATAN REPUBLIK INDONESIA

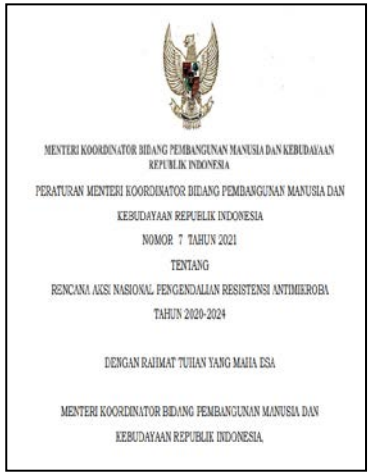
PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA
NOMOR 28 TAHUN 2021
TENTANG
PEDOMAN PENGGUNAAN ANTIBIOTIK

DENGAN RAHMAT TUHAN YANG MAHA ESA

MENTERI KESEHATAN REPUBLIK INDONESIA,

Antimicrobial Stewardship Program in Hospital Guideline

Coordinating Minister for Human Development and Culture Regulation No. 7/2021 AMR National Action Plan 2020-2024



MENTERI KOORDINATOR BIDANG PEMBANGUNAN MANUSIA DAN KEBUDAYAAN REPUBLIK INDONESIA

PERATURAN MENTERI KOORDINATOR BIDANG PEMBANGUNAN MANUSIA DAN KEBUDAYAAN REPUBLIK INDONESIA
NOMOR 7 TAHUN 2021
TENTANG
RENCANA AKSI NASIONAL PENGENDALIAN RESISTENSI ANTIMIKROBA TAHUN 2020-2024

DENGAN RAHMAT TUHAN YANG MAHA ESA

MENTERI KOORDINATOR BIDANG PEMBANGUNAN MANUSIA DAN KEBUDAYAAN REPUBLIK INDONESIA,

MOH Regulation No 1128/2022 Hospital Accreditation Standard

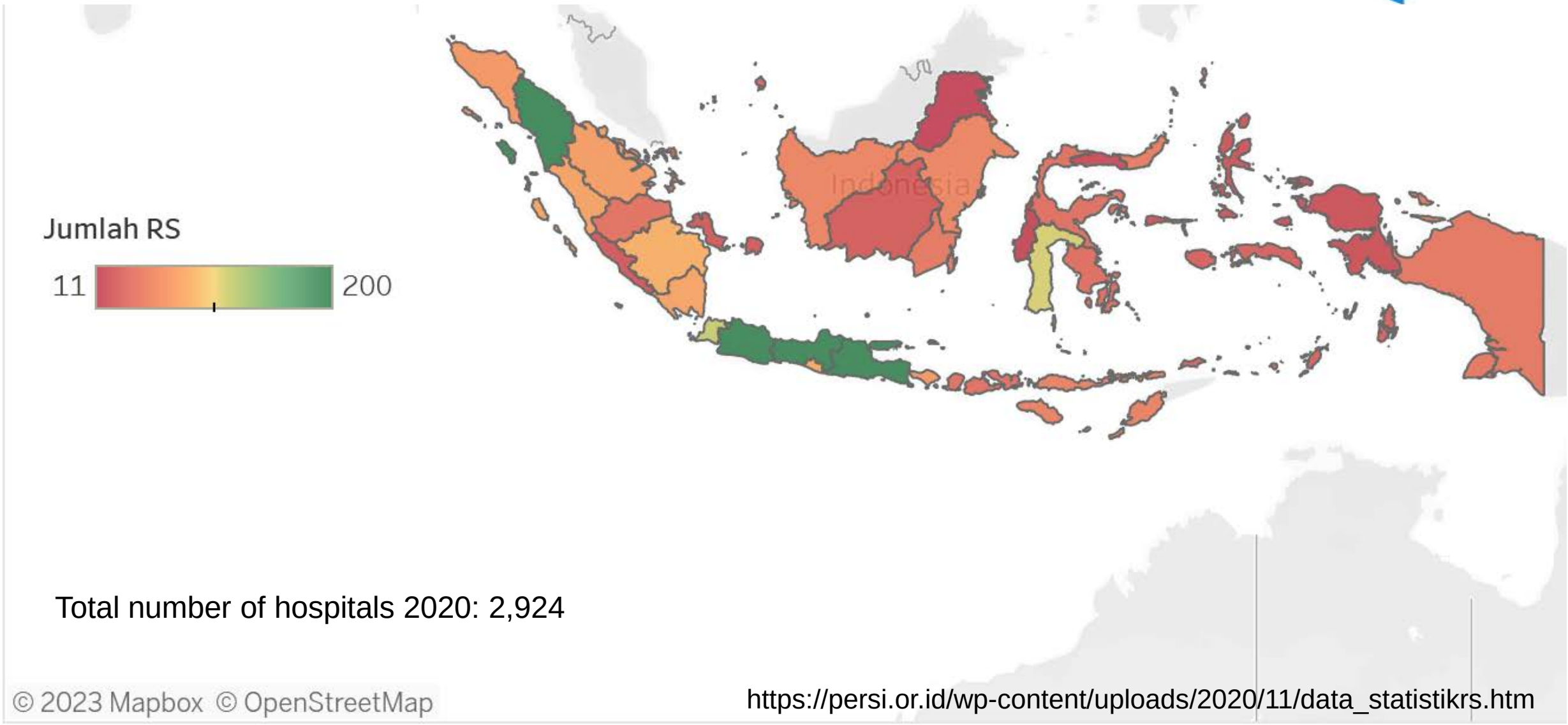
MENTERI KESEHATAN REPUBLIK INDONESIA

KEPUTUSAN MENTERI KESEHATAN REPUBLIK INDONESIA
NOMOR HK.01.07/MENKES/1128/2022
TENTANG
STANDAR AKREDITASI RUMAH SAKIT

DENGAN RAHMAT TUHAN YANG MAHA ESA

MENTERI KESEHATAN REPUBLIK INDONESIA,

Hospital mapping in Indonesia



Total number of hospitals 2020: 2,924

https://persi.or.id/wp-content/uploads/2020/11/data_statistikrs.htm

Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report

2021 → 2022

World Health Organization

Indonesia

Population 270.63 million

Indonesia also completed the first phase of the Global Integrated Survey on ESBL producing E.coli-Tricycle Project which aimed to strengthen the antimicrobial resistance (AMR) surveillance system and promote integrated surveillance across human, animal and environment sectors using the One Health approach.

SURVEILLANCE ACTIVITIES	IMPLEMENTATION
GLASS-AMR	✓
GLASS-AMC	✓
HIV DR[1]	✓
DR-TB[2]	✓
Malaria TES[3]	✓
One health	✓
EGASP	

1. HIV Drug-Resistance
2. Drug-resistant TB
3. Malaria Therapeutic Efficacy Studies

National AMR surveillance systems key indicators

Indicators reported to GLASS

20 surveillance sites participating to the national surveillance system

20 hospitals

20 laboratories performing AST
EQA provided to all laboratories

NRL
Established

AST standard
CLSI

EQA
Provided

in 2020 data call
16 surveillance sites providing data to GLASS (16 hospitals)

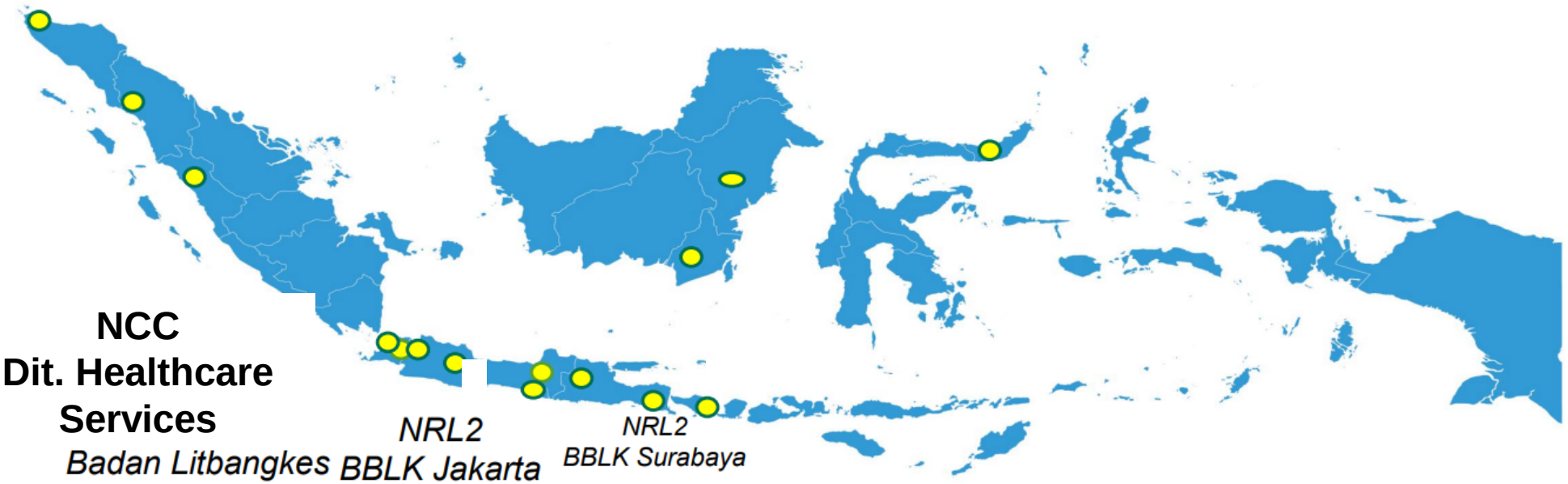
NCC
Established

National Action Plan
In place

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

INASS - NCC, NRL, & *SENTINEL SITE*
2019 -2021

GERMAS
Gerakan Masyarakat Hidup Sehat



NCC
Dit. Healthcare Services
Badan Litbangkes

NRL2
BBLK Jakarta

NRL2
BBLK Surabaya

RSUD Zainul Abidin
RSUP Adam Malik
RSUP M. Djamil
RSUP Hasan Sadikin
RSUP Gunawan M

RSUP Persahabatan
RSPI Sulianti Saroso
RSUP Fatmawati
RSUD Tarakan
RSUPN Cipto Mangunkusumo

RSUPAD Gatot Subroto
RSUP Karyadi
RSUD Sutomo
RSUD Saiful Anwar
RSUP Sanglah

RSUP Kandou
RSUD Moewardi
RSUP Soeradji
RSUD Kanudjoso
RSUP Ulin

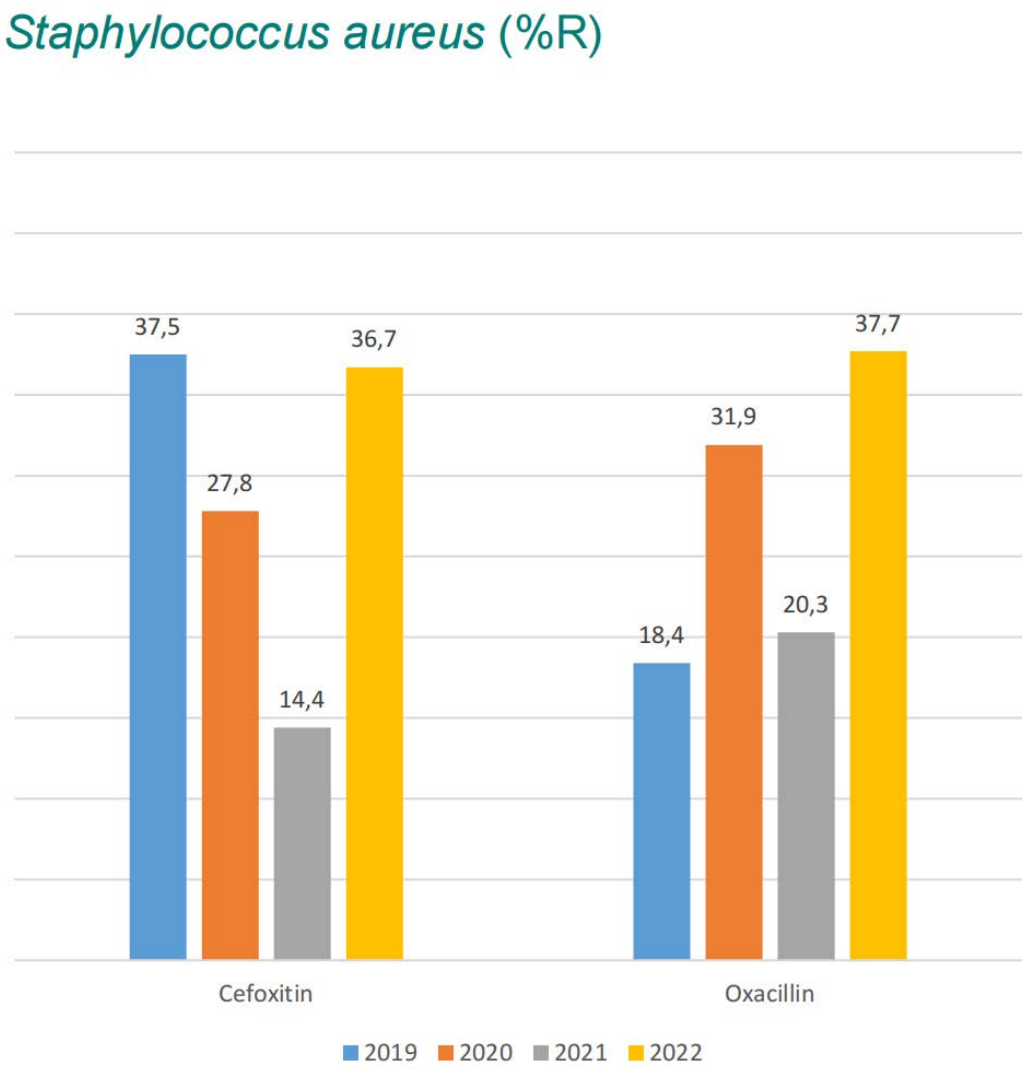
Resistance pathogens isolated from blood

Bacteria	3rd Cephalosporine (%R)				Fluroquinolone (%R)				Carbapenems (%R)			
	2019*	2020*	2021*	2022*	2019*	2020	2021	2022	2019	2020	2021	2022
Escherichia coli	62%	67%	61%	68%	54%	66%	63%	72%	6%	4%	4%	5%
Klebsiella pneumoniae	62%	74%	59%	73%	35%	53%	50%	68%	12%	16%	19%	25%
Acinetobacter baumannii	-	-	-		-	-	-		24%	44%	56%	67%

*year of reporting

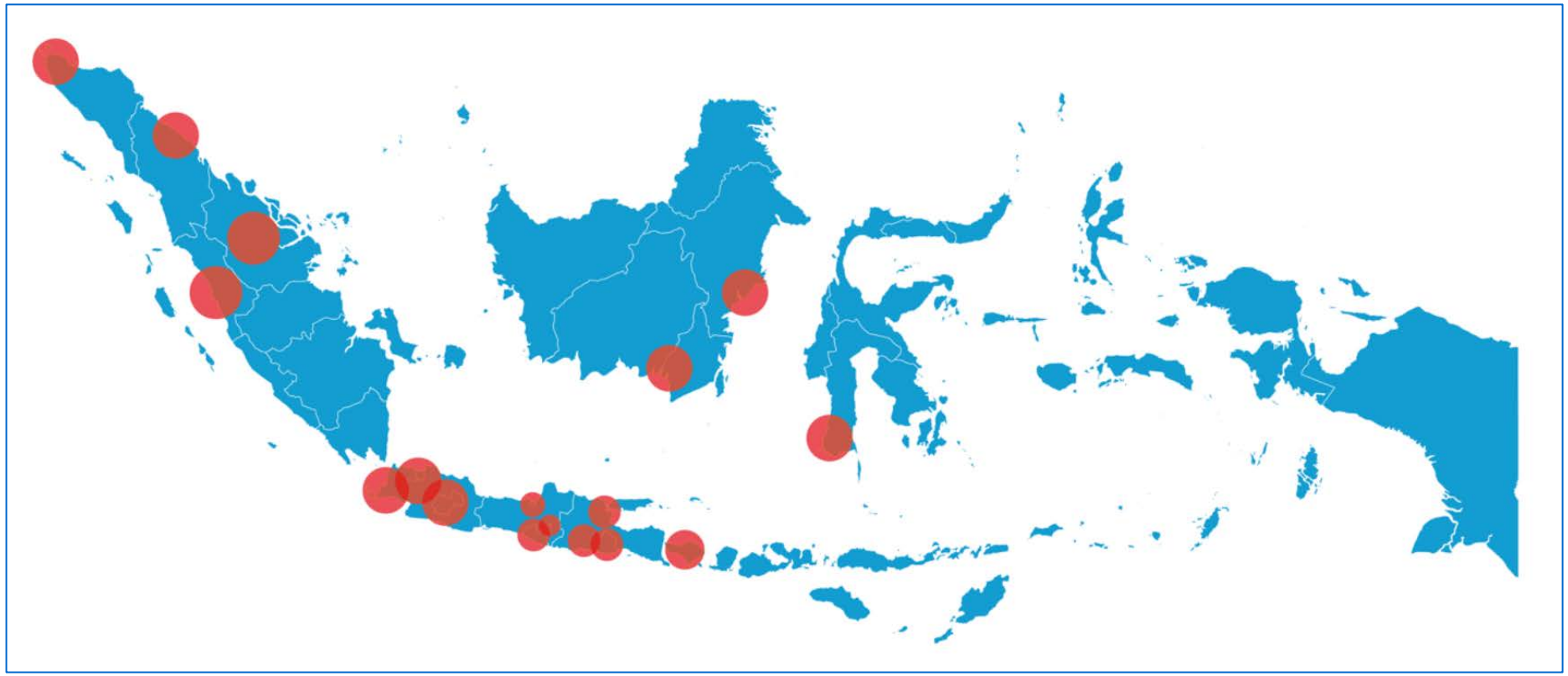
https://worldhealthorg.shinyapps.io/glass-dashboard/_w_e764ea54/#!/cta-profiles

Resistance pathogens isolated from blood



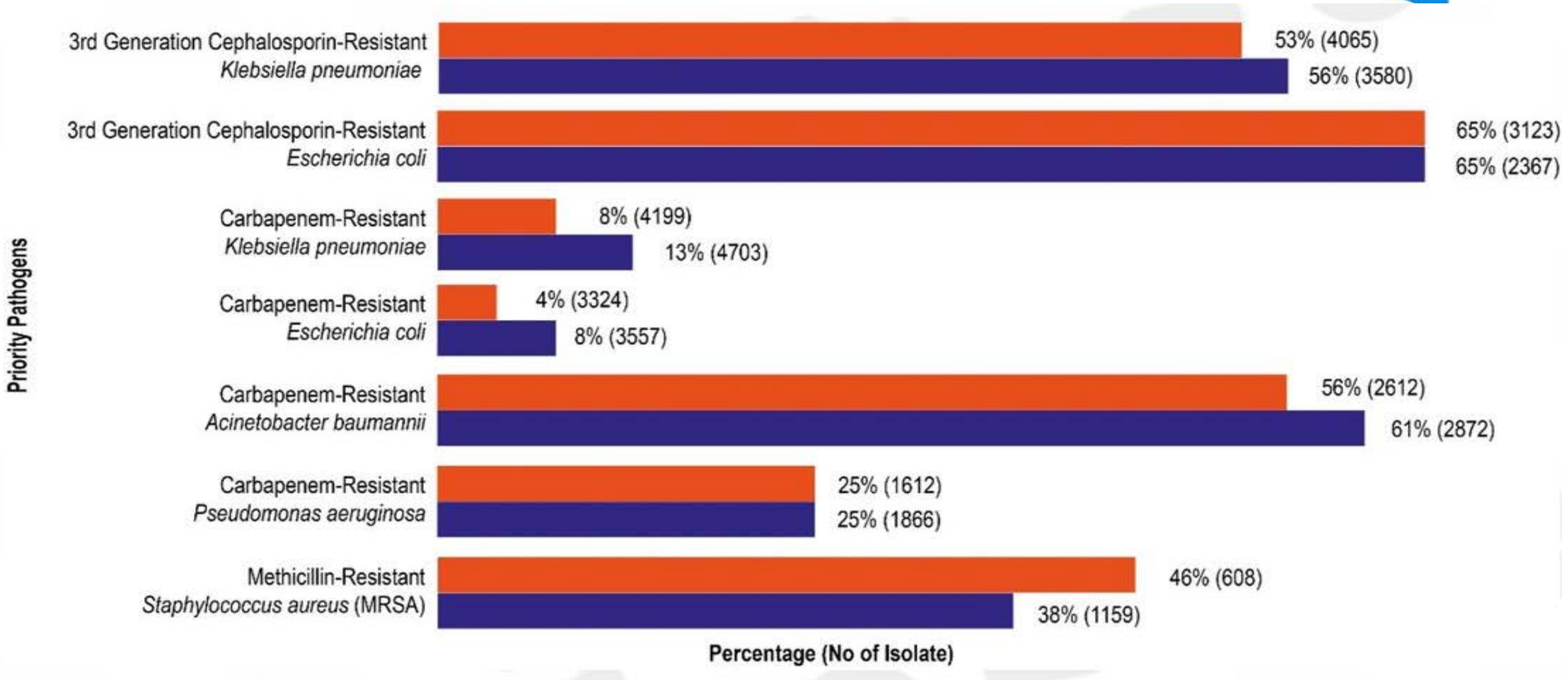
https://worldhealthorg.shinyapps.io/glass-dashboard/_w_e764ea54/#!/cta-profiles

AMR Surveillance by Indonesian association for clinical microbiology



Data sources: 51 hospitals located in 15 province, consists of:
16 type A hospitals (province referal hospital)
30 type B hospitals (district hospital)
5 type C hospitals (subdistrict hospital)

Multidrug resistant organisms



2020: 24 hospitals

2021: 51 hospitals

ESBL producing E.coli

One Health 13 (2021) 100331

Contents lists available at ScienceDirect

One Health

journal homepage: www.elsevier.com/locate/onehlt

Extended spectrum beta-lactamase-producing *Escherichia coli* surveillance in the human, food chain, and environment sectors: Tricycle project (pilot) in Indonesia

Nelly Puspandari [a,*], Sunarno Sunarno [a], Tati Febrianti [a], Dwi Febriyana [a], Ratih Dian Saraswati [a], Indri Rooslamiati [a], Novi Amalia [a], Sundari Nursofiah [a], Yudi Hartoyo [a], Herna Herna [a], Mursinah Mursinah [a], Fauzul Muna [a], Nurul Aini [a], Yenni Risniati [b], Pandji Wibawa Dhewantara [c], Puttik Allamanda [d], Dwi Nawang Wicaksana [d], Rinto Sukoco [d], Efadeswarni [e], Erni Juwita Nelwan [f], Cahyarini [g], Budi Haryanto [g], Benyamin Sihombing [h], Ricardo J. Soares Magalhães [i], Manish Kakkar [j], Vivi Setiawaty [a], Jorge Matheu [k]

[a] *Centre for Research and Development of Biomedical and Basic Health Technology, National Institute of Health Research and Development, Ministry of Health, Jakarta, Indonesia*
[b] *Centre for Research and Development of Health Resources and Services, National Institute of Health Research and Development, Ministry of Health, Jakarta, Indonesia*
[c] *Centre for Research and Development of Public Health Efforts, National Institute of Health Research and Development, Ministry of Health, Jakarta, Indonesia*
[d] *Disease Investigation Center Subang, West Java, Indonesia*
[e] *Research and Development for Environmental Quality and Laboratory Center, Banten, Indonesia*
[f] *Ciptomangunkusumo Hospital, University of Indonesia, Jakarta, Indonesia*

ESBL producing E.coli

Table 1
Characteristics of the samples and ESBL-producing *E. coli* identification across sectors.

Variable	Human sector		Animal sector/food chain	Environment sector
	Pregnant women	Bloodstream infection patient		
Sample	rectal swab	blood culture	broiler cecum	river surface water
Number of samples	100	116	240	119
Sampling sites	1 Primary Health Care (PHC) Facility	2 hospitals	6 markets/ slaughterhouses	3 up/midstream sites, 6 markets/ slaughter houses, and 3 downstream sites
Sampling time	10 months	14 months	10 months	10 months
Epidemiology data	yes	yes	yes	no
Laboratory	NIHRD*	Hospital Lab and NIHRD	DIC**	CRDEQL***
Primary culture	MacConkey and MacConkey+CTX	Bactec	MacConkey+CTX	TBX and TBX + CTX
E. coli identification	indole test	Vitek-2	indole test	indole test
ESBL identification+ confirmatory	DDST****	Vitek-2	DDST****	DDST****

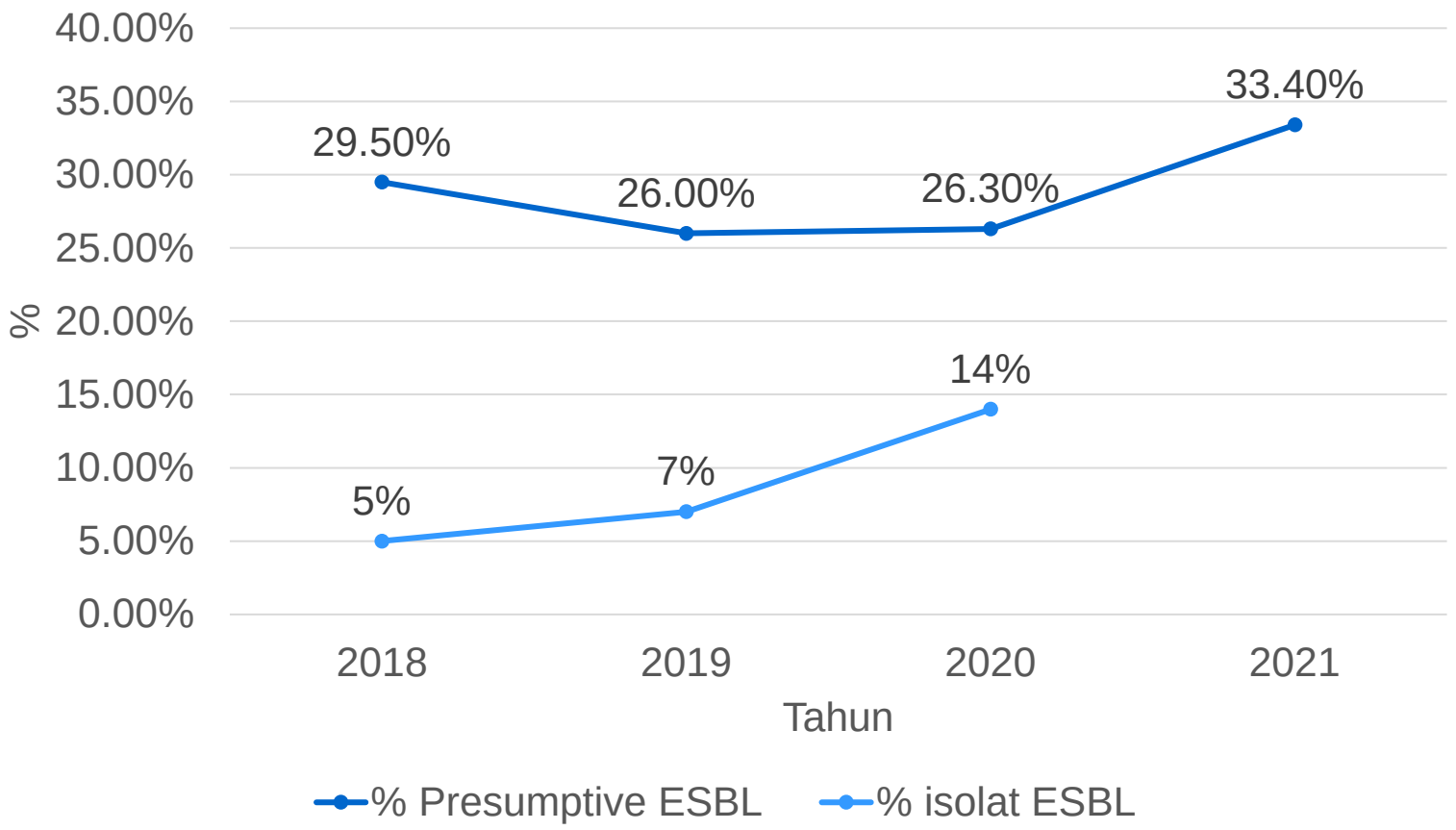
*The Research Laboratory for Infectious Diseases, NIHRD, Jakarta **Disease Investigation Center Subang, West Java, ***the Centre for Research and Development of Environment Quality Laboratory, Banten, ****Double Disk Sinergy Test.

ESBL producing E.coli	40%	**57,7%**	67,1%	**12,8%**

Average E.coli $2{,}0 \times 10^8$ CFU/100ml

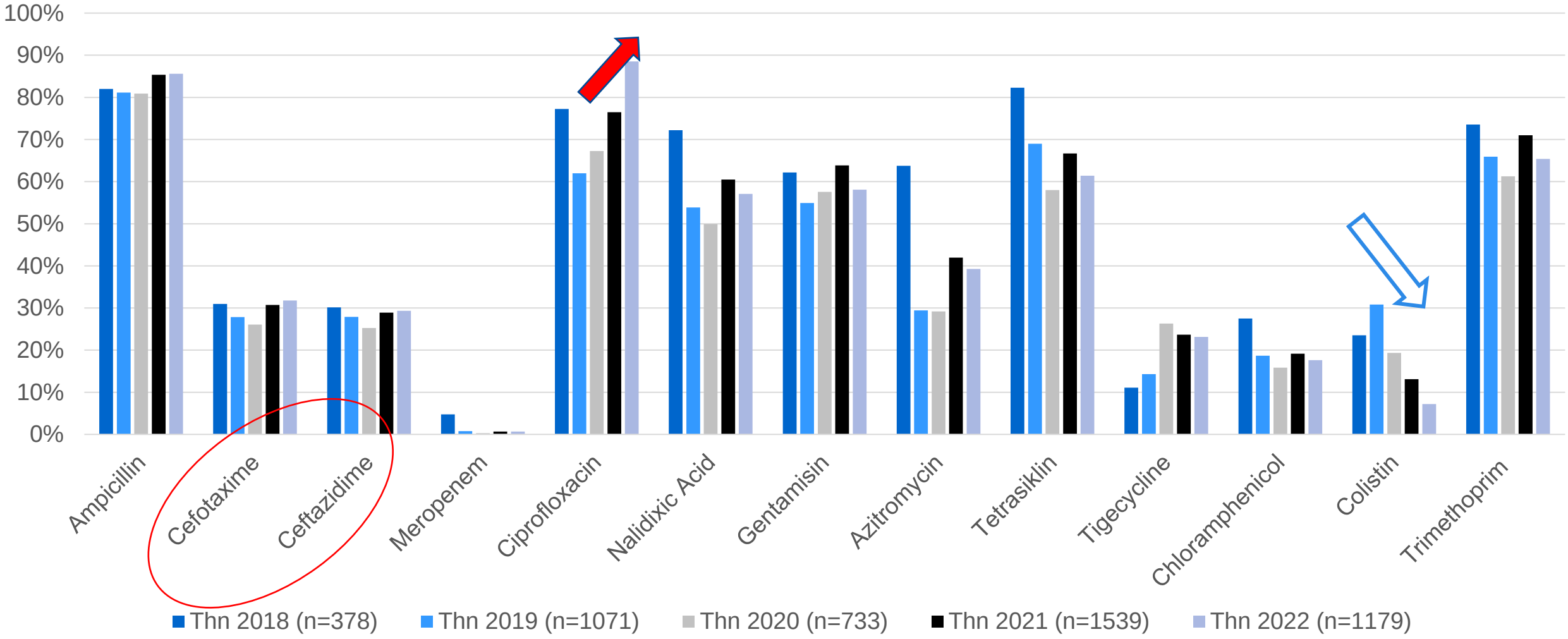
ESBL producing *E.coli* in Broiller

Tahun	N Isolat *E. coli*	N Presumptive ESBL	N isolat ESBL
2018	380	112	20
2019	1.072	279	76
2020	733	193	104
2021	1570	525	-
2022	1179	-	-
TOTAL	4934	584	200



Presented by Ditjen of Animal Health, MoA in Monev of NAP on AMR in Indonesia, August, 29th 2023

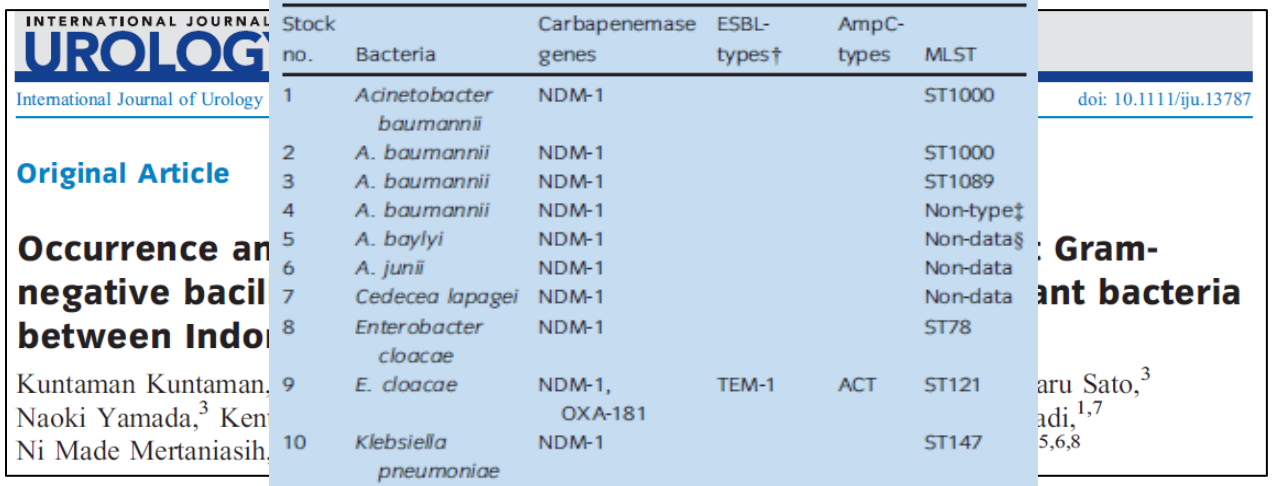
E. coli isolated from commercial broiler farms 2018-2022 (% *resistances*)



Presented by Ditjen Animal Health, MoA in Monev of NAP on AMR in Indonesia, August, 29th 2023

Molecular AMR Surveillance: not available

2018



INTERNATIONAL JOURNAL
UROLOG
International Journal of Urology

doi: 10.1111/iju.13787

Original Article

Occurrence an … Gram-negative bacil … ant bacteria between Indo…

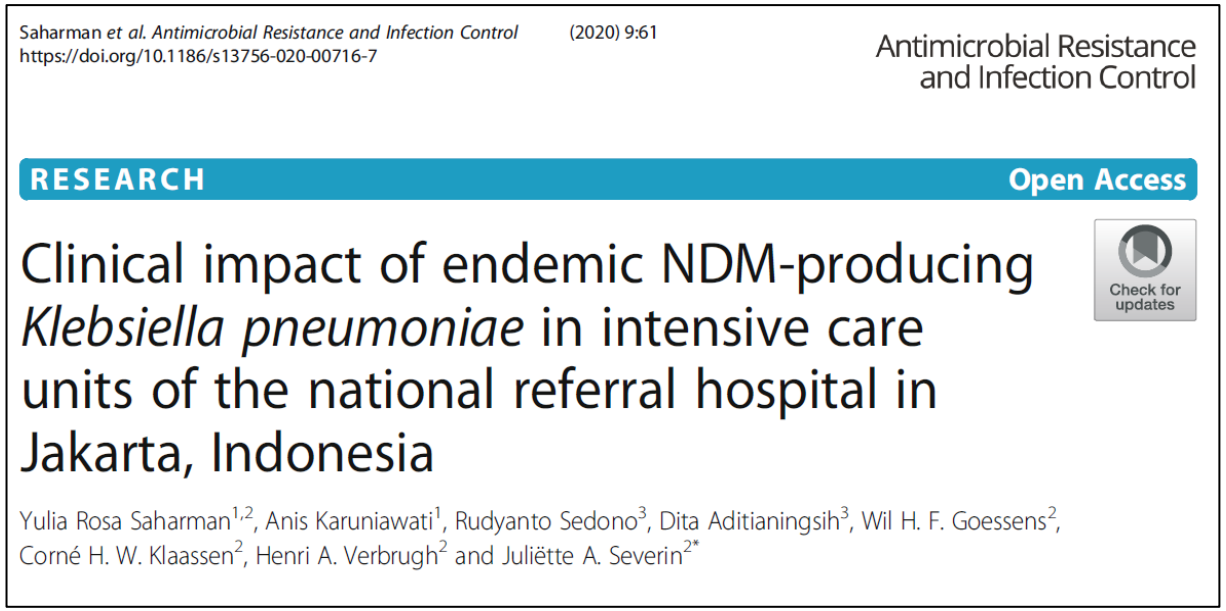
Kuntaman Kuntaman, … aru Sato,[3] Naoki Yamada,[3] Ken… adi,[1,7] Ni Made Mertaniasih… 5,6,8

Table 1 Carbapenemase, extended-spectrum β-lactamase and AmpC genotypes in isolated carbapenem-resistant Gram-negative bacteria with MLST

Stock no.	Bacteria	Carbapenemase genes	ESBL-types†	AmpC-types	MLST
1	*Acinetobacter baumannii*	NDM-1			ST1000
2	*A. baumannii*	NDM-1			ST1000
3	*A. baumannii*	NDM-1			ST1089
4	*A. baumannii*	NDM-1			Non-type‡
5	*A. baylyi*	NDM-1			Non-data§
6	*A. junii*	NDM-1			Non-data
7	*Cedecea lapagei*	NDM-1			Non-data
8	*Enterobacter cloacae*	NDM-1			ST78
9	*E. cloacae*	NDM-1, OXA-181	TEM-1	ACT	ST121
10	*Klebsiella pneumoniae*	NDM-1			ST147
11	*K. pneumoniae*	NDM-1	SHV-12, TEM-1		ST273
12	*K. pneumoniae*	NDM-1	CTX-M-15, TEM-1		ST307
13	*K. pneumoniae*	NDM-1			ST307
14	*K. pneumoniae*	NDM-1			ST1473
15	*Providencia rettgeri*	NDM-1	CTX-M-15	DHA	Non-data
16	*P. rettgeri*	NDM-1			Non-data
17	*P. rettgeri*	NDM-1			Non-data
18	*P. rettgeri*	NDM-1			Non-data
19	*Pseudomonas aeruginosa*	IMP-7			ST622
20	*P. aeruginosa*	IMP-7			ST622
21	*P. aeruginosa*	IMP-7			ST622
22	*P. aeruginosa*	IMP-7			ST622

†Extended-spectrum β-lactamase. ‡"Non-type" was not typed by MLST. *A. baumannii*: *gltA-gyrB-gdhB-recA-cpn60-gpi-rpoD* = 28-38-45-1-16-100-2. §"Non-data" means no database for the bacteria.

2020



Saharman *et al. Antimicrobial Resistance and Infection Control* (2020) 9:61
https://doi.org/10.1186/s13756-020-00716-7

Antimicrobial Resistance and Infection Control

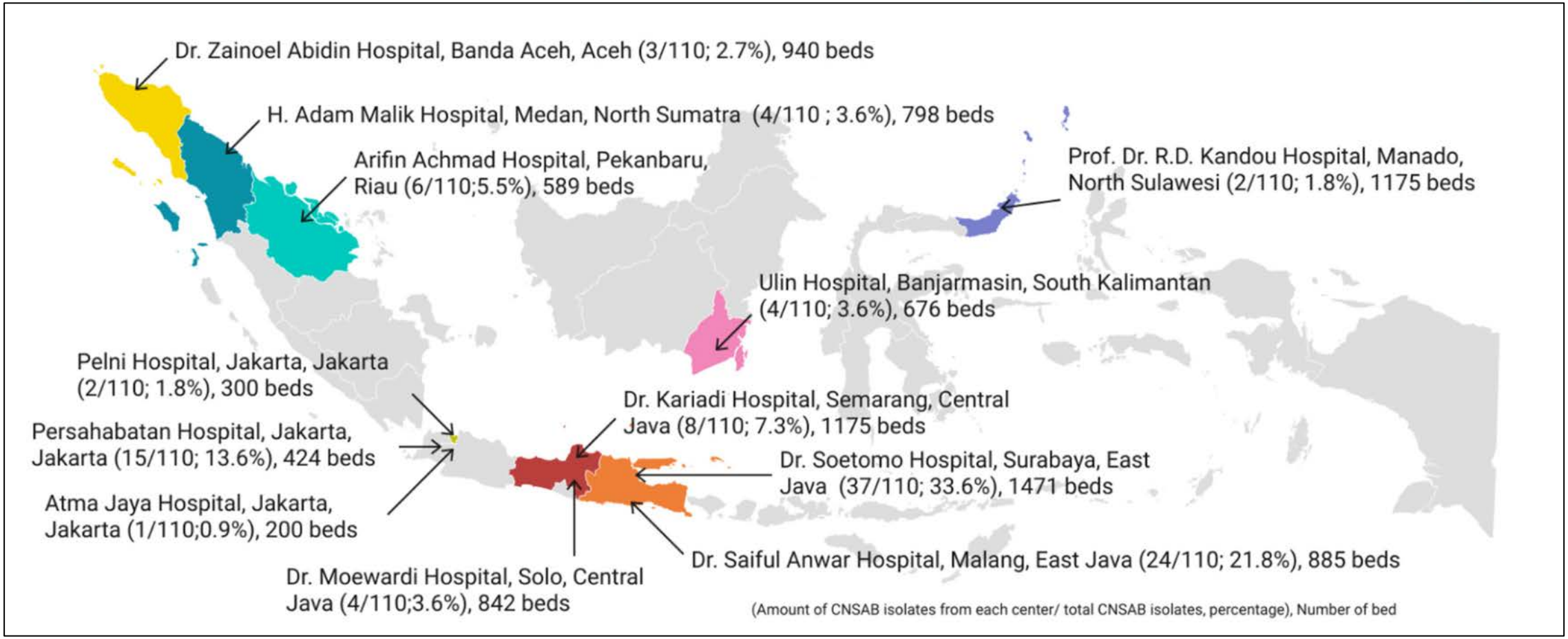
RESEARCH Open Access

Clinical impact of endemic NDM-producing *Klebsiella pneumoniae* in intensive care units of the national referral hospital in Jakarta, Indonesia

Yulia Rosa Saharman[1,2], Anis Karuniawati[1], Rudyanto Sedono[3], Dita Aditianingsih[3], Wil H. F. Goessens[2], Corné H. W. Klaassen[2], Henri A. Verbrugh[2] and Juliëtte A. Severin[2*]

- **96 (96%) produced MBL → *bla*NDM positive**
- **None of the 100 CNKP has KPC or OXA-48**

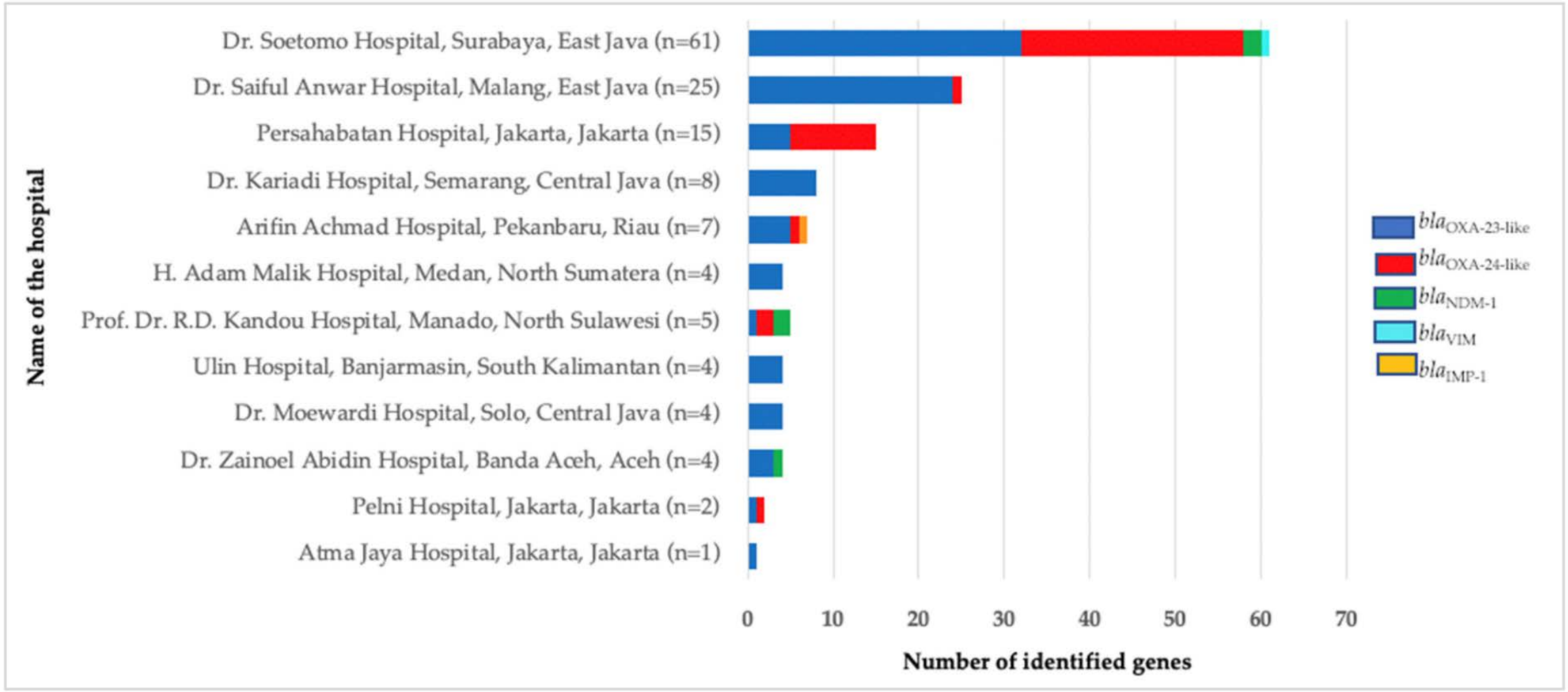
Carbapenemase Genes among CNS *A.baumanii*



Distribution of CNSAB isolates with confirmed *gyrB* gene (N=110)

Anggraini, D. et al. Distribution of Carbapenemase Genes among Carbapenem-Non-Susceptible Acinetobacter baumanii Blood Isolates in Indonesia: A Multicenter Study. Antibiotics 2022, 11, 366. https://doi.org/10.3390/antibiotics1103036

Carbapenemase Genes among CNS *A.baumanii*



Anggraini, D. et al. Distribution of Carbapenemase Genes among Carbapenem-Non-Susceptible Acinetobacter baumanii Blood Isolates in Indonesia: A Multicenter Study. Antibiotics 2022, 11, 366. https://doi.org/10.3390/antibiotics1103036

AMR Control Challanges in Asia

JAC-

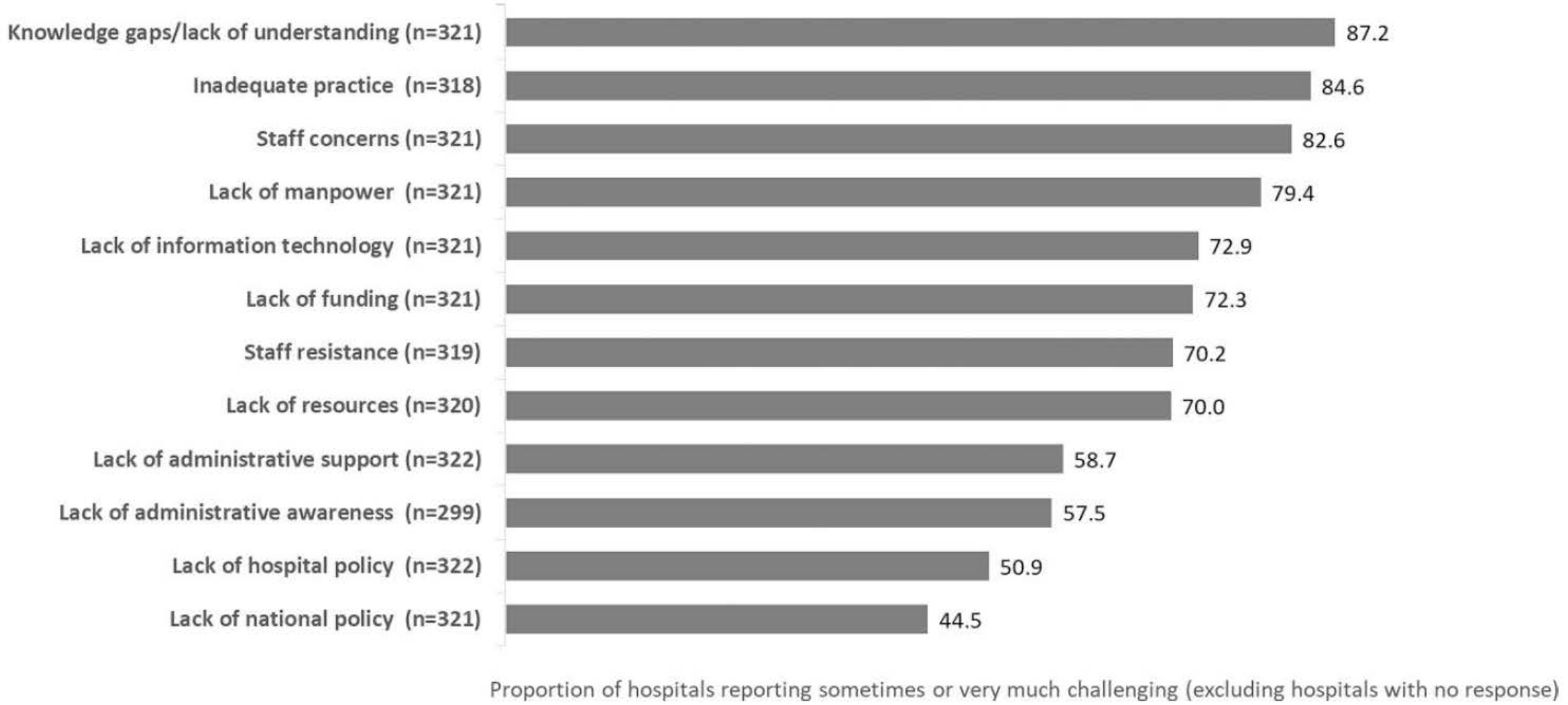


Figure 2. Challenges faced when implementing hospital AMS programmes.

AMR Surveillance Challanges

Human Health

TrACSS asks for a rating of national capacity and progress on a five-point scale (A to E), with the levels A-B representing limited capacity, and levels C-E representing nationwide implementation for most indicators. Countries should be aiming to reach levels C-E on all indicators.

capacity	
none	A
limited	B
developed	C
demonstrated	D
sustained	E

Food and Ag
Organizatio
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l Health

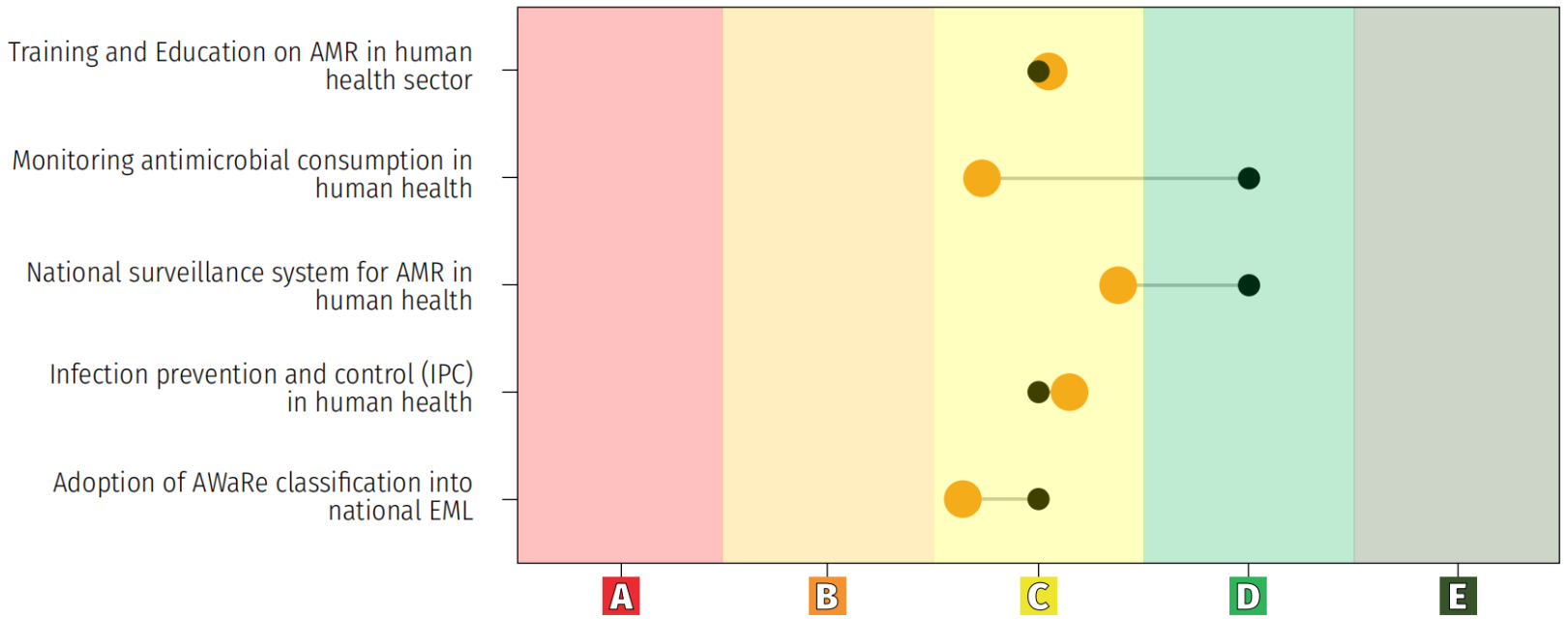
Tracking AMR C
2022 Country R

donesia

Comparison of global average versus country's responses

Distance visualization between a country's response and global averages

Global
Country



TrACSS 2022, global data are averages, countries without data removed

The country dot is the answer provided by the country to the questionnaire. The global average is computed using numerical values assigned to the categories (A = 1, B = 2, ...), summed, and simply divided by the number of countries that participated in the 2022 TrACSS.

AMR Surveillance Challanges

Animal Health

TrACSS asks for a rating of national capacity and progress on a five-point scale (A to E), with the levels A-B representing limited capacity, and levels C-E representing nationwide implementation for most indicators. Countries should be aiming to reach levels C-E on all indicators.

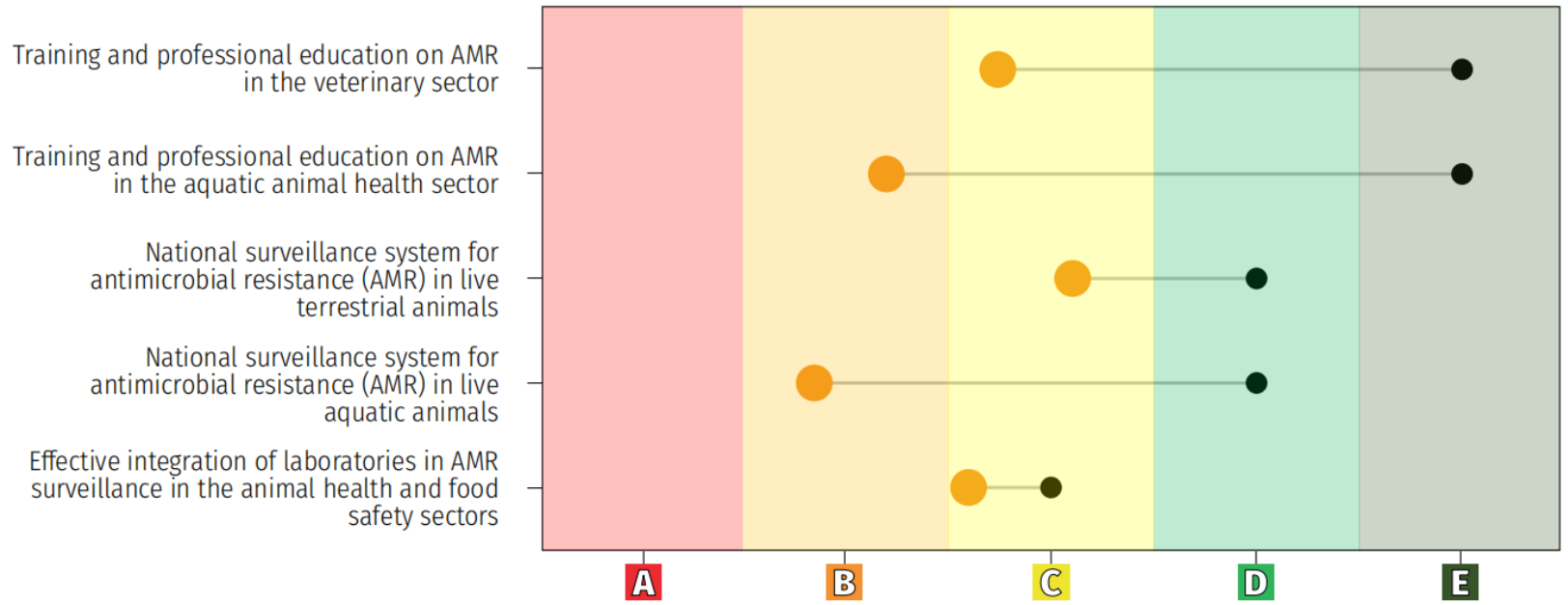
capacity

none	A
limited	B
developed	C
demonstrated	D
sustained	E

Comparison of global average versus country's responses

Distance visualization between a country's response and global averages

Global ●
Country ●



TrACSS 2022, global data are averages, countries without data removed

The country dot is the answer provided by the country to the questionnaire. The global average is computed using numerical values assigned to the categories (A = 1, B = 2, ...), summed, and simply divided by the number of countries that participated in the 2022 TrACSS.

AMR Surveillance Challanges

- Lab and diagnostics - strengthen lab and diagnostic capacity, including:
  - quality assurance
  - affordable price of consumables
  - uninterrupted supply of consumables nationwide

- Intergrated AMR reporting system is not in place (will be developed in 2024)

AMR Surveillance Challanges

- Cost of microbiology tests is high

- Referal system of AMR:
  - Hospital referal system of emerging infectious diseases (incl. AMR) is developed in 2023
  - Referal system for public health laboratory is being developed

Summary

- AMR is a global problem, including Indonesia
- Gram negative bacilli is predominant MDR pathogens
- Strengthening of laboratory and diagnostic capacity is a priority
- Integrated AMR surveillance reporting system is needed
- Referal system for microbiology laboratory and immediate response should be established to strengthen the AMR prevention and control