

Digital Antimicrobial Stewardship:

a micro design as an effort for developing antimicrobial stewardship system & ecosystem



Ronald Irwanto Natadidjaja

Tzu Chi Hospital

Faculty of Medicine Universitas Trisakti

RASPRO Indonesia Study Group

INDONESIA

www.new.rasproindonesia.com



Tzu Chi Hospital



Jakarta, Indonesia



***Faculty of Medicine
Universitas Trisakti***

National Taiwan University Hospital – June 2024

BACKGROUND



Futuristic Fashion in Antimicrobial Used - The WHO “Kick of” in 2023

Shifting WATCH to $\geq 60\%$ ACCESS

诚 正 信 实

Sincerity Honesty Trust Earnestness

***Dr. Ronald Irwanto Natadidjaja, SpPD, Subsp.PTI(K), FINASIM
Internist – Infectious Disease (ID) Specialist
INDONESIA***

Aztrenonam
Ceftazidime Avibactam
Ceftaroline Fosamil
Ceftolozane Tazobactam

**Imipenem cilastatin-
relebactam**

Fosfomycin IV
Colistin
Polymixin B
Tygecycline

RESERVED

This group includes antibiotics and antibiotic classes that **should be reserved** for treatment of confirmed or suspected infections due to multi-drug-resistant organisms. Reserve group antibiotics should be treated as “last resort” options.

Quinolones
Azithromycin

**2nd , 3rd & 4th Generation
of Cephalosporin**

Piperacillin Tazobactam
Carbapenems

WATCH

This group includes antibiotic classes that have higher resistance potential and includes most of the highest priority agents among the Critically Important Antimicrobials for Human Medicine and/or antibiotics that are at relatively high risk of selection of bacterial resistance. These medicines should be prioritized as key targets of stewardship programs and monitoring. Selected Watch group antibiotics are recommended as essential first or second choice empiric treatment options for a limited number of specific infectious syndromes and are listed as individual medicines on the WHO Model Lists of Essential Medicines.

Ampicillin Sulbactam
Ampicillin
Amoxicillin Clavulanate
Amoxicillin

**1st Generation of
Cephalosporin**

Amikacin
Gentamycin

ACCESS

This group includes antibiotics that have activity against a wide range of commonly encountered susceptible pathogens while also showing lower resistance potential than antibiotics in the other groups. Selected Access group antibiotics are recommended as essential first or second choice empiric treatment options for infectious syndromes reviewed by the EML Expert Committee and are listed as individual medicines on the Model Lists of Essential Medicines to improve access and promote appropriate use.

AWARE 2021





Artikel Penelitian

Survei Persepsi Kebutuhan dan Hambatan Rumah Sakit dalam Menjalankan Fungsi Panitia Pengendalian Resistensi Antibiotik

RONALD IRWANTO^{1,2}, DJOKO WIDODO², AZIZA ARIYANI³, HADIANTI ADLANI²

¹ Fakultas Kedokteran, Universitas Trisakti, Jakarta

² Perhimpunan Kedokteran Tropis dan Penyakit Infeksi Indonesia

³ Pengurus Pusat Perkumpulan Pengendalian Infeksi Indonesia

Email korespondensi: ronald.irwanto@yahoo.com

Dikirimkan 28 April 2019, Diterima 11 Juli 2019

Hasil: Pada survei ini diperoleh 26.92% dari 156 rumah sakit yang telah menjalankan program PPRA di rumah sakit. 65.38% menyatakan hanya sebagian dokter yang duduk sebagai anggota PPRA mampu melakukan tugasnya. 40.48% dari responden rumah sakit yang telah menjalankan program PPRA mengatakan bahwa tidak adanya sistem implementasi merupakan kesulitan utama dalam menjalankan program PPRA. Sementara 61.90% mengatakan anggota PPRA rumah sakitnya baru setengah mampu melakukan restriksi antibiotik. 93.86% dari 114 responden rumah sakit yang belum menjalankan program PPRA menyatakan saat ini yang paling dibutuhkan adalah konsep yang jelas untuk menjalankan program PPRA.

	Jumlah (n)	Persentase (%)
Persepsi Responden Terhadap Kemampuan Dokter sebagai Anggota PPRA di Rumah Sakit		
Mampu	36	23.0%
Sebagian Mampu	102	65.38%
Tidak Mampu	12	7.69%
Tidak Tahu	6	3.85%
TOTAL	156	100.00%
Persepsi Terhadap Hambatan dalam Pelaksanaan Program di RS yang Sudah Menjalankan PPRA		
Membuat PPAB	8	19.05%
Praktik Implementasi PPAB	17	40.48%
Restriksi Antibiotik	14	33.33%
Evaluasi Antibiotik	3	7.14%
TOTAL	42	100.00%
Persepsi Responden Terhadap Kemampuan Anggota PPRA dalam Melakukan Restriksi AB		
Sepenuhnya Mampu	6	14.29%
Belum Sepenuhnya Mampu	26	61.90%
Belum mampu	9	21.43%
Tidak tahu	1	2.38%
TOTAL	42	100.00%
Persepsi Kebutuhan dalam Pelaksanaan PPRA bagi Rumah Sakit yang Belum Menjalankan PPRA		
Konsep pelaksanaan program yang jelas	107	93.86%
Restriksi Antibiotik	1	0.88%
Evaluasi dan Pelaporan Penggunaan Antibiotik	1	0.88%
Pengambilalihan Tanggung Jawab Pemberian Semua Antibiotik oleh PPRA	5	4.39%
TOTAL	114	100.00%

National Taiwan University Hospital – June 2024

Digital System



e-RASPRO Model

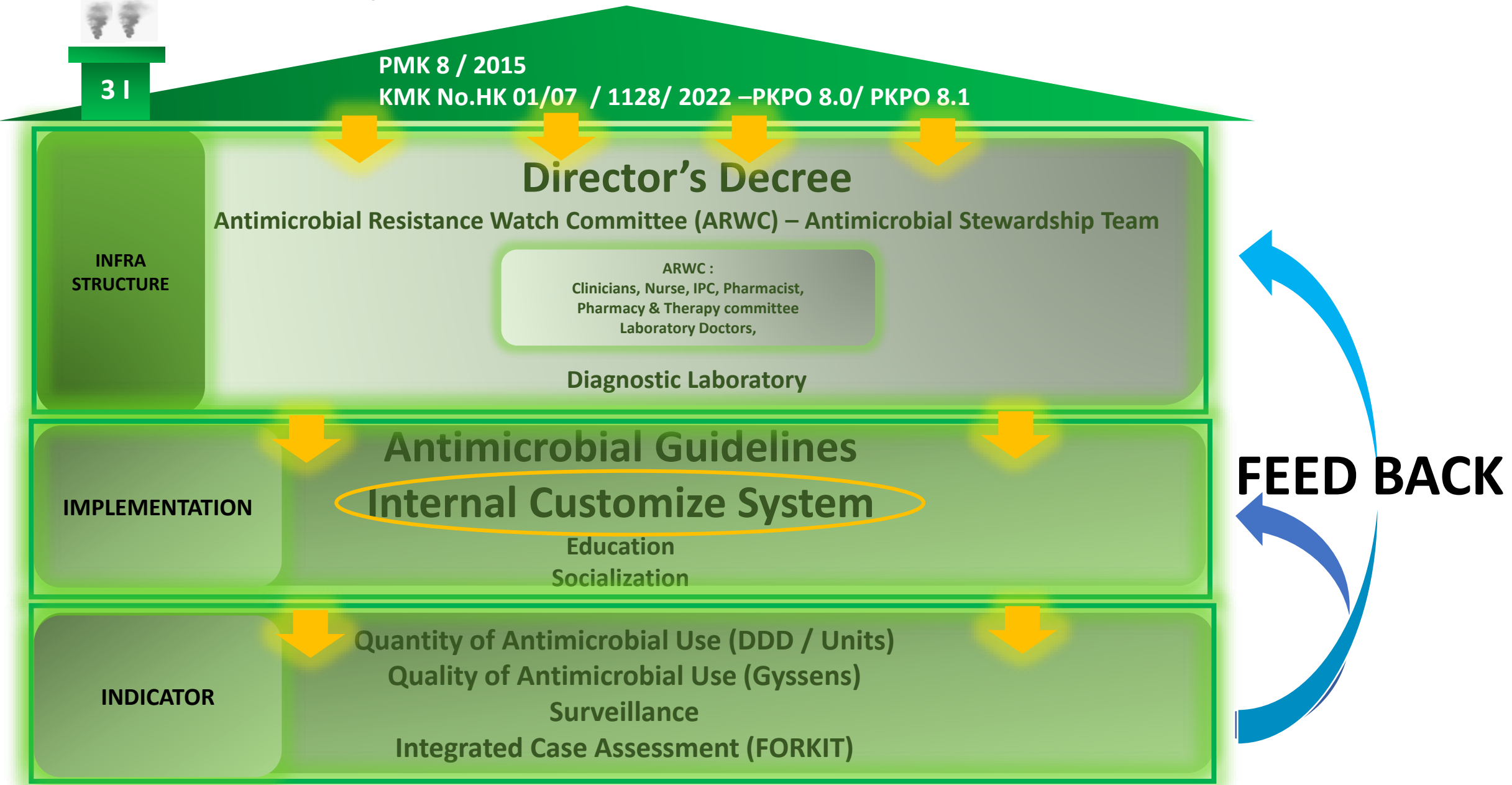
Developing antimicrobial stewardship system & ecosystem

诚 正 信 实

Sincerity Honesty Trust Earnestness

***Dr. Ronald Irwanto Natadidjaja, SpPD, Subsp.PTI(K), FINASIM
Internist – Infectious Disease (ID) Specialist
INDONESIA***

***RASPRO Indonesia Study group to
Create the RASPRO Concept***



RASPRO Manual Model

RASPRO Digital Model

Parallel & Integrated with Hospital IT

Formulir RASPTUR 1.0

Ketentuan

Nama Pasien

Nomor RM

Fokus Infeksi

Spesimen

Antibiotik diber

1.

2.

RASPRO Alur Antibiotik Awal (RASAL 1.0) Copyright: Ronald Irwant					
NO.	SPEKIFIKASI	FLOW	KET.	TINDAKAN	AL
1.	Fokus infeksi dengan gejala infeksi	Tidak	henti	Tidak perlu antibiotik	
2.	Klinis progresif Sepsis / Septic Shock / Febril Netropenia / Terkategori HAI	Ya	henti	Antibiotik Stratifikasi Risiko Tipe III	
3.	Perforasi				
4.	Encephalo				
5.	(Immunoc				
6.	(Immunoc				
7.	(Immunoc				
8.	(Immunoc				
9.	(Immunoc				
10.	(Immunoc				

RASPRO Alur Antibiotik Lanjutan (RASLAN 1.0) Copyright: Ronald Irwant			
NO.	SPEKIFIKASI	FLOW	TINDAKAN
1.	Gejala infeksi masih ada	Henti	De-ekskali antibiotik sesuai kultur / step-down antibiotik ke stratifikasi risiko yang lebih rendah / pindah IV
2.	Klinis progresif Sepsis / Syok Sepsis / Febril Netropenia / HAI		
3.	Komplikasi perforasi organ		
4.	Komplikasi ensefalopati et causa infeksi bakterial		
5.	Gejala infeksi perbaikan pada 3-7 hari pemberian an		

RASPRO Formulir Antibiotik Berkepanjangan

Ketentuan :

- Digunakan pada pasien yang diberikan antibiotik di luar panduan antibiotik dalam jangka waktu yang lebih dari yang ditetapkan se
- Disisi oleh dokter / klinisi peresep obat
- Untuk kalangan sendiri.
- Bukan untuk policy restriksi antibiotik, melainkan untuk identifi

I. Identitas Pasien

Nama Pasien :

Umur :

Jenis Kelamin :

No. RM :

II. Indikasi Penggunaan Antibiotik

A. Ada, sebutkan :

B. Tidak ada

III. Bila Terdapat Indikasi Penggunaan Antibiotik

Fokus Infeksi :

Gejala Infeksi Saat Ini :

a. Negatif

b. Positif, sebutkan :

IV. Komorbid

A. Ada

B. Tidak ada

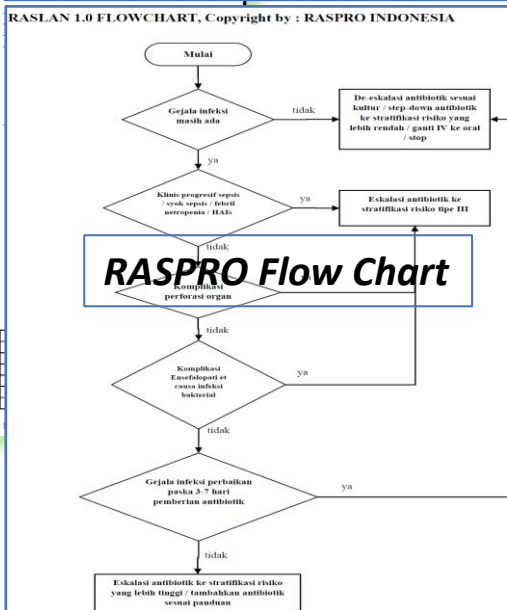
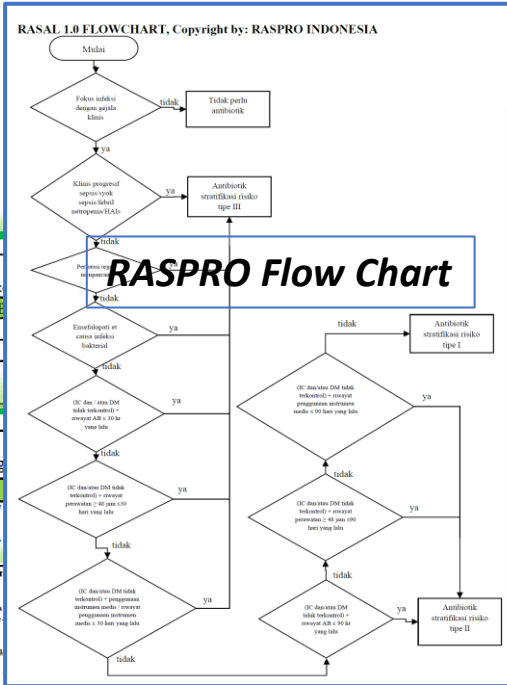
Bila ada : (boleh diisi lebih dari satu)

- Diabetes melitus
- Imobilisasi
- Retensi sputum
- Keganasan
- Febrile Netropenia
- Penggunaan instrumentasi
- HIV / AIDS
- Autoimmune
- Lain-lain, sebutkan :

V. Antibiotik yang Digunakan

No.	Jenis	Dosis
1.		
2.		
3.		
4.		
5.		
6.		

Alasan penggunaan antibiotik di luar panduan / jangka waktu di



Digital Empiric Antibiotic Guidelines by Patient Risk Stratification (RASPRO Indonesia Model)

Is patient sepsis / febrile neutropenia / healthcare associated infections? AND / OR Is there any threatening organ perforation? AND / OR Is there any bacterial encephalopathy?

If Yes **Life threatening**

Request by system and local empiric guidelines for **WATCH** or **RESERVE** Group Antibiotic
Anti ESBLs / Pseudomonas sp / Anti MRSA
Note: by onsite consultation with ASP team

Define the Patient Risk Stratification
Type 3 **Local empiric guidelines: WATCH Group Antibiotic**
Type 2 **Local empiric guidelines: ACCESS Group Antibiotic**
Type 1 **Local empiric guidelines: ACCESS Group Antibiotic**

Pharmacist screen

Evaluation:
If:
Empiric / Prophylaxis Antibiotic:
Is it Antibiotic ACCESS / WATCH / RESERVE?
Is it proper with local guidelines?
If:
Definitive:
Check the data Is it Antibiotic ACCESS / RESERVE?

Duration of Empiric Antibiotic Use
De-Escalation to DEFINITIVE Antibiotic
Onsite consultation with ASP team

Nurse Screen

Watching:
Empiric / Prophylaxis / Definitive
Dose & Duration of Empiric Antibiotic Usage
De-Escalation to DEFINITIVE Antibiotic

MENU: RUMAH SAKIT & PASIEN

MENU: TIN PDA

MENU: GUIDELINES

Digital Model e-RASPRO Parallel & Integrated System

• Clinical

Site of infection:

Bacterial:

“Big Four”: Pneumonia, UTI, SSTI, Intra-Abdominal
Others: Intracranial, Central Line Associated BSIs, etc

Viral:

Upper respiratory tract
Lower respiratory tract – viral pneumonia
GI Tract
Unspecified

• Laboratory

Full Blood Count, CRP, Procalcitonin
PCR

If the infection syndrome caused by viral
such as Influenzae, Dengue, COVID-19, others
→ The antibiotic should be **RESTRICTED**

PASIE BARU

EMPIRIK/DEFINITIF PROFILAKSIS

DASHBOARD DOKTER

Date : 01/10/2023 13/10/2023

Nama / RM :

SHOW EXCEL

NO PASIE HISTORY

1 Choose the antibiotic indication:
Empiric/Definitive
Prophylaxis

DATA PASIEN RAWAT INAP

RM

Nama Pasien

Nama Ruangan

Nomor Kamar

e-RASAL e-DEFINITIF

2 If we choose empiric/definitive:
Confirmation:
empiric (e-RASAL) or
definitive (e-definitive)

e-RASAL

Antibiotic prudent use system by RASPRO

Fokus infeksi dengan gejala

TIDAK YA

3 If we choose empiric:
Define the bacterial focus of infection

PILIH JENIS INFEKSI

Search...

(Stratifikasi 1) Pneumonia / Infeksi Paru Lainnya

(Stratifikasi 1) Bakterial Tonsilitis / Abses Peritonsil

(Stratifikasi 1) Intra Bilier, Pankreatitis dan Intra Hepatik (termasuk Abses Hati)

(Stratifikasi 1) Extra Bilier

(Stratifikasi 1) Typhoid Fever

(Stratifikasi 1) Disentri Basiler

4 Choose the focus of infection
1,2,3 and more focus of infection can be
covered by the system

5

AND / OR

AND / OR

If Yes

Life threatening

Anti ESBLs / Pseudomonas sp / Anti MRSA

Note: by onsite consultation with ASP team

6

AND / OR

AND / OR

If NO

(Imunokompromis DAN / ATAU DM tidak terkontrol) + (Riwayat Penggunaan Antibiotik DAN / ATAU Riwayat Hospitalisasi >=48 jam DAN / ATAU Riwayat Penggunaan Instrumen Medis < 30 hari yang lalu) ATAU (Imunokompromis DAN / ATAU DM tidak terkontrol dengan Penggunaan Instrumen Medis saat ini)

Type 3

Type 2

Type 1

WATCH Group Antibiotic

Local empiric guidelines:

ACCESS Group Antibiotic

Digital Empiric Antibiotic Guidelines by Patient Risk Stratification (RASPRO Indonesia Model)

The screenshot shows a medical consultation interface. At the top, there is a header bar with the text "Antibiotic product use system by RADPRO". Below this, the patient's history is displayed in a table-like format with two columns: "Antibiotic" and "Dose". The patient's history includes:

Antibiotic	Dose
Amoxicillin	500 mg
Clarithromycin	500 mg
Clindamycin	300 mg
Doxycycline	100 mg
Erythromycin	250 mg
Gentamicin	80 mg
Penicillin	1 million units
Spectinomycin	200 mg
Tetracycline	500 mg
Vancomycin	500 mg

Below the patient's history, there is a section for the doctor's response. The doctor's response is displayed in a text box with the following text:

"(Amoxicillin 500 mg) / (Amoxicillin clavulanat 500 / 100) / (Amoxicillin Subcutan 500 / 100) <- Gentamisin <-> Metronidazole 500mg
Alternatif atau Pengganti / Lain-lain:
(Levofloxacin 500 / 100) / (Ciprofloxacin 500 / 100) / (Azithromycin 500 / 100) <-> Metronidazole 500mg
Keterangan : Metronidazole diberikan apabila teridentifikasi Abses
Pada Streptifikasi Risiko Tipe 1 jika antibiotik yang digunakan terkategori WATCH (Levofloxacin, Ciprofloxacin, Azithromycin) baru dengan konsultasi dengan Tim PKA. Kontraindikasi anak disebabkan dengan Peer Group Anak Dosis normal / High dose pada anak disebabkan sesuai anamnesis / Epidemiologi Peer Group Anak."



e-DEFINITIF
Antibiotic prudent use system by RASPRO

Spesimen *

TENTUKAN FOKUS INFEKSI

Antibiotic De-Escalation
Timing
Focus of Infection
Specimen from site of infection

Obat	Detail	
Ampicillin Sulbactam	Frek : 3 Dosis : 1.5 Satuan : gr Track : Drip REGULAR	

Clinicians should “click” here if need to add antibiotic combination or change the empiric antibiotic by Risk Stratification system

PILIH JENIS INFEKSI

Search..

Pneumonia / Infeksi Paru Lainnya

Bakterial Tonsilitis / Abses Peritonsil

Intra Bilier dan Intra Hepatik (termasuk Abses Hati)

Extra Bilier

Typhoid Fever

Disentri Basiler

RASAL
 Create Date : 2023-10-13 21:37
 Created By : DR. RONALD

Konsultasi Team PGA

Antibiotik stratifikasi tipe I
 1. (Stratifikasi 1) Pneumonia / Infeksi Paru Lainnya

GUIDE

Antibiotik Yang Ditambahkan :

Obat	Detail
Ampicillin Sulbactam	Frek : 3 Dosis : 1.5 Satuan : gr Track : Drip REGULAR

Obat Dalam Konfirmasi

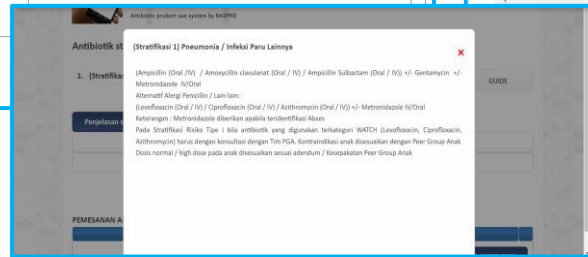
Obat Dibatalkan

RM : 237
 Nama : TN.MIKPO

PERAWATAN SELESAI

DETAIL	13 OKT 23
Ampicillin Sulbactam	Ampicillin Sulbactam 2023-10-13
Frek : 3	<input type="checkbox"/>
Dosis : 1.5	<input type="checkbox"/>
Satuan : gr	<input type="checkbox"/>
Track : Drip	
Tipe : REGULAR	
1 Hari	

SUBMIT



Pharmacist screen

Evaluation:

If:

Empiric / Prophylaxis Antibiotic:

Is it Antibiotic ACCESS / WATCH / RESERVE?

Is it proper with local guidelines?

If:

Definitive:

Check the data Is it Antibiotic ACCESS / WATCH / RESERVE?

Duration of Empiric Antibiotic Usage

De-Escalation to DEFINITIVE Antibiotic

Is the any dose adjusted?

Onsite consultation with ASP team if it's needed

Nurse Screen

Watching :

Empiric / Prophylaxis / Definitive

Dose & Duration of Empiric Antibiotic Usage

De-Escalation to DEFINITIVE Antibiotic

Obat	Detail
Ampicillin Sulbactam	Frek : 3 Dosis : 1.5 Satuan : gr Track : Drip REGULAR

e-RASAL

e-RASLAN

e-RASPRAJA

e-RASPATUR

e-RASGRASI

e-PROFILAKSIS

Clinicians should "click" here if the antibiotic use more than time limit. Explain the reason of antibiotic prolong usage. if NOT → Automatic Stop Order (ASO) will be enforced

National Taiwan University Hospital – June 2024

Making the
System


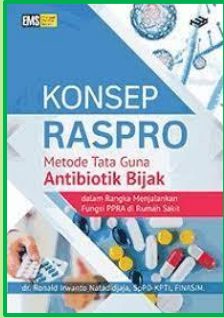


Process View : How to Develop the Digital Antimicrobial Stewardship

诚 正 信 实

Sincerity Honesty Trust Earnestness

***Dr. Ronald Irwanto Natadidjaja, SpPD, Subsp.PTI(K), FINASIM
Internist – Infectious Disease (ID) Specialist
INDONESIA***

Risk Stratification Type 3	Risk Stratification Type 2	Risk Stratification Type 1
<p>Severe /HAIs / Febrile Neutropenia / Threatening Organ Perforation AND / OR Immunocompromized AND / OR Uncontrolled DM : + History of antibiotic use in the last 30 days AND / OR History of ≥ 48 hours hospitalization in the last 30 days AND / OR History medical devices use in the last 30 days</p>	<p>Non Severe / Non Life Threatening – Non HAIs Immunocompromized AND / OR Uncontrolled DM : History of antibiotic use in the last 90 days AND / OR History of ≥ 48 hours hospitalization in the last 90 days AND / OR History medical devices use in the last 90 days</p>	<p>Non Risk Stratification Type 3 and / or 2</p> <div data-bbox="1793 471 2507 672">  </div> <div data-bbox="2303 761 2525 1075">  </div>
<p>Empiric Antibiotic for Severe Case or Suspected ESBLs or Other MDRO</p>	<p>Empiric Antibiotic for Suspected (Beta Lactamase Producers) to ESBLs</p>	<p>Empiric Antibiotic for Multi-Sensitive Organism</p>
<div>RESERVE</div> <div>RESERVE</div> <div>WATCH</div> <div>WATCH</div>	<div>WATCH</div> <div>WATCH</div> <div>WATCH</div> <div>ACCESS</div>	<div>ACCESS</div> <div>ACCESS</div> <div>ACCESS</div> <div>ACCESS</div> <div>ACCESS</div>

Risk Stratification Type 3

Risk Stratification Type 2

Risk Stratification Type 1

Gomila A, Shaw E, Carratalà J, Leibovici L, Tebé C, Wiegand I, et al. Predictive factors for multidrug-resistant gram-negative bacteria among hospitalised patients with complicated urinary tract infections. *Antimicrob Resist Infect Control*. 2018;7(1):1–11. doi: 10.1186/s13756-018-0401-6

Falcone M, Russo A, Giannella M, Cangemi R, Scarpellini MG, Bertazzoni G, et al. Individualizing risk of multidrug-resistant pathogens in community-onset pneumonia. *PLoS One*. 2015;10(4):1–16. doi: 10.1371/journal.pone.0119528

Musikataworn K, Chumpengpan C, Sujinpram C. Risk factors of extended-spectrum beta-lactamase-producing Enterobacteriaceae bacteremia in Thai emergency department: A retrospective case-control study. *Asian Biomed*. 2011;5(1):129–38. doi: 10.5372/1905-7415.0501.016

Patolia S, Abate G, Patel N, Patolia S, Frey S. Risk factors and outcomes for multidrug-resistant Gram-negative bacilli bacteremia. *Ther Adv Infect Dis*. 2018;5(1):11–8. doi: 10.1177/2049936117727497%0A

Seligman R, Ramos-Lima LF, Oliveira V do A, Sanvicente C, Sartori J, Pacheco EF. Risk factors for infection with multidrug-resistant bacteria in non-ventilated patients with hospital-acquired pneumonia. *J Bras Pneumol*. 2013;39(3):339–48. doi: 10.1590/s1806-37132013000300011

Prina E, Ranzani OT, Polverino E, Cillóniz C, Ferrer M, Fernandez L, et al. Risk factors associated with potentially antibiotic-resistant pathogens in community-acquired pneumonia. *Ann Am Thorac Soc*. 2015;12(2):153–60. doi: 10.1513/AnnalsATS.2014.07.3050C

Haque M, Sartelli M, Mckimm J, Abu Bakar M. Infection and Drug Resistance Dovepress Health care-associated infections-an overview. *Infect Drug Resist*. 2018;11(1):2321–33. doi: 10.2147/IDR.S177247

Revelas A. Healthcare - associated infections: A public health problem. *Niger Med J*. 2012;53–64(2):59. doi: 10.4103/0300-1652.103543

Cardoso T, Almeida M, Friedman ND, Aragao I, Costa-Pereira A, Sarmento AE, et al. Classification of healthcare-associated infection: a systematic review 10 years after the first proposal. *AJIC Am J Infect Control*. 2014;12(40):1–13. doi: 10.1186/1741-7015-12-40

World Health Organization. Report on the Burden of Endemic Health Care-Associated Infection Worldwide Clean Care is Safer Care. World Health Organization. Geneva, Switzerland; 2011. Available from: www.who.int

Natadidjaja RI, Kusuma AS, Sudradjad GB, Nugrohowati L. The Association between Medical History-based Risks and Sepsis Events in Immunocompromised Patients according to Type III Stratification of the Indonesian Regulation on the Prospective Antimicrobial System (Regulasi Antimikroba Sistem Prospektif / RASPRO). *Bali Med J*. 2021;10(3):1031–6. doi: 10.15562/bmj.v10i3.2561

Ben-Ami R, Rodríguez-Baño J, Arslan H, Pitout JDD, Quentin C, Caibo ES, et al. A multinational survey of risk factors for infection with extended-spectrum β -lactamase-producing enterobacteriaceae in nonhospitalized patients. *Clin Infect Dis*. 2009;49(5):682–90. doi: 10.1086/604713

Marchaim D, Gottesman T, Schwartz O, Korem M, Maor Y, Rahav G, et al. National multicenter study of predictors and outcomes of bacteremia upon hospital admission caused by Enterobacteriaceae producing extended-spectrum β -lactamases. *Antimicrob Agents Chemother*. 2010;54(12):5099–104. doi: 10.1128/AAC.00565-10

Hayakawa K, Gattu S, Marchaim D, Bhargava A, Palla M, Alshabani K, et al. Epidemiology and risk factors for isolation of escherichia coli producing ctx-m-type extended-spectrum-lactamase in a large U.S. Medical Center. *Antimicrob Agents Chemother*. 2013;57(8):4010–8. doi: 10.1128/AAC.02516-12

Johnson SW, Anderson DJ, May BD, Drew RH. Utility of a Clinical Risk Factor Scoring Model in Predicting Infection with Extended-Spectrum β -Lactamase-Producing Enterobacteriaceae on Hospital Admission. *Infect Control Hosp Epidemiol*. 2013;34(4):385–92. doi: 10.1086/669858

Aliberti S, Di Pasquale M, Zanaboni AM, Cosentini R, Brambilla AM, Seghezzi S, et al. Stratifying risk factors for multidrug-resistant pathogens in hospitalized patients coming from the community with pneumonia. *Clin Infect Dis*. 2012;54(4):470–8. doi: 10.1093/cid/cir840

Capsoni N, Bellone P, Aliberti S, Sotgiu G, Pavanello D, Visintin B, et al. Prevalence, risk factors and outcomes of patients coming from the community with sepsis due to multidrug resistant bacteria. *Multidiscip Respir Med*. 2019;14(23):1–11. doi: 10.1186/s40248-019-0185-4

Journal citations



Empiric Antibiotic for Severe Case or Suspected ESBLs or Other MDRO

Empiric Antibiotic for Suspected (Beta Lactamase Producers) to ESBLs

Empiric Antibiotic for Multi-Sensitive Organism

RESERVE

RESERVE

WATCH

WATCH

WATCH

WATCH

WATCH

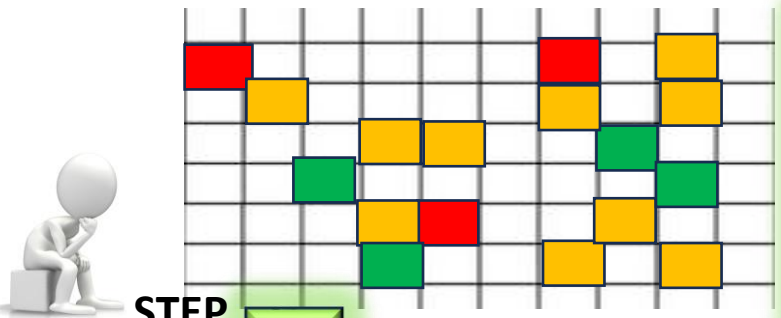
ACCESS

ACCESS

ACCESS

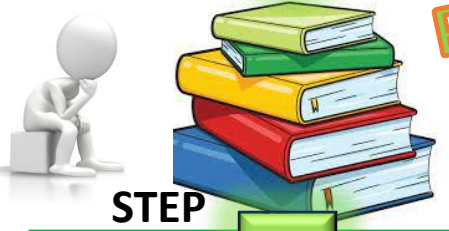
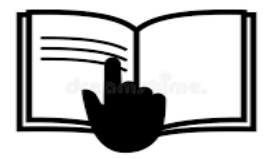
ACCESS

ACCESS



Antibiograms

RASPRO 3 TCP		
Timing	CLSI /	Proper setting
Technic	Complete MIC/	Proper size
Transport	Complete Disc	Proper Percentage



Pro & Cons

In vitro sensitivity
Pharmacokinetic-
Pharmacodynamic
National Regulation

Journal synthesis

Antibiogram as a consideration for making antibiotic guidelines is different from surveillance
Sample should be homogenous in COLLECTING TIME, HOST STATUS, MEDICAL HISTORY.
In RASPRO model we should think about microbiologic pattern form each risk stratification for translating into the empiric antibiotic guidelines
PLUS
Do Journal Synthesis

HOMOGENIZATION
Specimen Collecting Timing
Setting
Host Status



Alternative treatment
Sparing regiments
Prize
BPJS claim

Hospital Antibiotics Stock Data

Check the availability of antibiotics in hospitals and national stock

DISCUSSION
Internal Expert Peer Review
Antimicrobial Resistance Watch
Hospital Management



RASPRO Indonesia

RASPRO Empirical Antibiotic Guidelines AWARE

RASPRO Risk Stratification : AWARE
a Model divide patients into 3 groups

Risk Stratification Type 3 :
Severe and/ or immunocompromised with Risk of ESBL + Other MDRO
Risk Stratification Type 2:
Mild - immunocompromised with Risk of (Beta lactamase Producers) to ESBLs
Risk Stratification Type 1 :
Non Risk Stratification Type 3 and / or 2

AGREEMENT
Agreement from hospital management

SOCIALIZATION
Guidelines and Flowchart
Training of Trainers
Clinicians
Pharmacist
Nurse

RASPRO Model on AWARE Categories Hospital Setting

Digital Mode

Empiric
Step Up
Step Down

Guidelines
Strat Risk Type I
Strat Risk Type II
Strat Risk Type II



Empiric

De-escalation

Definitive



Prophylaxis



ACCESS

WATCH

RESERVE

ACCESS

WATCH

RESERVE

ACCESS

If there is a
special case,
outside regulation

FREE by Indication

Supervision – Restricted
by Indication
PGA team agreement

FREE by Indication

Supervision – Restricted
by Indication
PGA team agreement

Supervision
PGA team agreement

Automatic STOP
Order if not
reasonable



Integrated
Assessment
(FORKIT)

National Taiwan University Hospital – June 2024

RESULTS



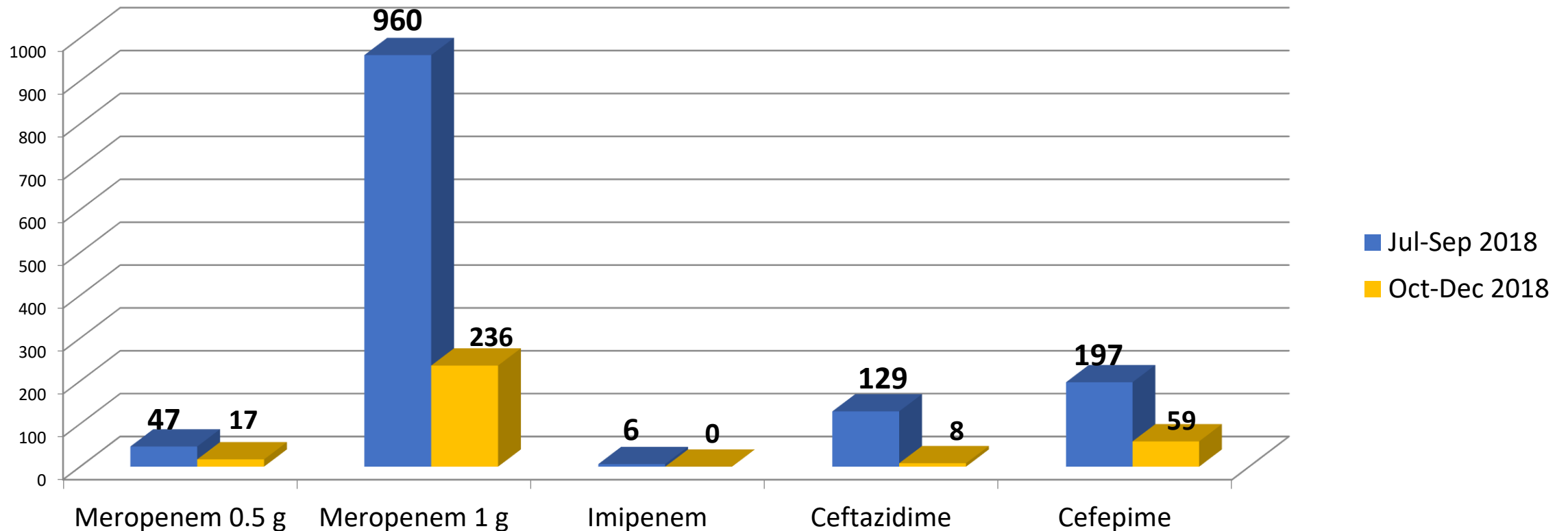
Before – After Implementation :
Based on Quality indicator by MoH – Republic of Indonesia

诚 正 信 实

Sincerity Honesty Trust Earnestness

Dr. Ronald Irwanto Natadidjaja, SpPD, Subsp.PTI(K), FINASIM
Internist – Infectious Disease (ID) Specialist
INDONESIA

Three Months Comparison of Broad Antibiotics Unit Sold: Before and After RASPRO-RASAL Criteria Implemented



Ronald Irwanto Natadidjaja*#, Yuhana Fitra, Yudianto Budi Saroyo**,
Augustine Matatula**, Rinna Wamila Sundariningrum**

(MANUAL Model)

ORIGINAL ARTICLE

Antibiotic usage at a private hospital in Central Java: results of implementing the Indonesian Regulation on the Prospective Antimicrobial System (Regulasi Antimikroba Sistem Prospektif Indonesia [RASPRO])

Ronald Irwanto Natadidjaja^{1,2*}, Tarcisius Henry¹, Hadiani Adlani¹, Aziza Ariyani¹ and Rika Bur¹

¹RASPRO Indonesia Study Group, Jakarta, Indonesia; ²Infectious Disease Division, Trisakti School of Medicine, Trisakti University, Jakarta, Indonesia

Abstract

Methods: A pre–post-descriptive study was conducted in 2019 for 3 months at a private hospital in Central Java, Indonesia, to evaluate the implementation of the Regulation on Indonesian Antimicrobial Stewardship Program (ASP), namely, the Prospective Antimicrobial System/Regulasi Antimikroba Sistem Prospektif Indonesia (RASPRO). Outcomes were measured before and after the implementation of the RASPRO in the ward including: 1) intravenous antibiotic defined daily dose (DDD) per 100 patient-days, 2) antibiotic expenditure, and 3) antibiotic expenditure per inpatient.

Result: The total antibiotic consumption was expressed in DDD/100 patient-days. For the levofloxacin category, the number increased intensely from 2.38 to 15.29; carbapenem escalated from 0.51 to 2.31, ceftriaxone from 32.10 to 38.03, and ampicillin sulbactam from 1.14 to 1.18. In contrast, cefuroxime significantly reduced from 17.25 to 1.38, cefotaxime decreased from 10.33 to 6.83, gentamicin decreased from 3.18 to 1.91, and amikacin decreased from 2.27 to 2.13. The overall cephalosporin usage decreased from 19.89 to 15.41. The total antibiotic expenditure had a decline of 20.28%, followed by 14.44% reduction on the percentage of antibiotic expenditure per inpatient.

Conclusion: Our study describes the 3-month analysis of antimicrobial usage before and after the implementation of the RASPRO by evaluating several parameters. The antibiotic consumption expressed in DDD/100 patient-days for each antibiotic category has demonstrated that there are different impacts that may be debatable and calls for further evaluation. A decrease in the total antibiotic expenditure has also been reported. However, since our study is a preliminary study, it should be continued by further studies that involve longer study duration to observe further impacts of the program.

MEETING ABSTRACTS

Open Access

International Conference on Prevention and Infection Control 2023



A quantitative survey of antibiotic use at a hospital in Jambi Province Indonesia in three-month before and after implementation of antimicrobial resistance control program by Raspro concept

R. I. Natadidjaja^{1,2,*}, R. Asmajaya², H. Basrie², H. Sumarsono²

¹Internal Medicine, Faculty of Medicine, Universitas Trisakti, ²Pelita RASPRO Indonesia Foundation, Jakarta Barat, Indonesia

Correspondence: R. I. Natadidjaja

Antimicrobial Resistance & Infection Control 2023, **12**(Suppl 1):P309

Introduction: Based on Decree of Minister of Health Number 8/2015 in article 11 concerning quality indicators of Antimicrobial Resistance Control Program (ARCP)/Program Pengendalian Resistensi Antimikroba (PPRA) implementation in hospitals, it has been known that reduced quantity of antimicrobial use has become one of those indicators.

Objectives: This survey is a descriptive study using secondary data retrieved between July and September 2019 (3 months before implementation of RASPRO concept) as well as between October and December 2019 (3 months after the implementation), which was aimed to evaluate impacts on implementing *Regulasi Antimikroba Sistem Prospektif (RASPRO)* concept at a hospital in Jambi province, Indonesia.

Methods: The survey was carried out by calculating the expenditure of 3 antibiotic classes, which were the most commonly used and usually given by injection in hospitals and Intensive Care Units (ICU)s, i.e. the beta-lactam, quinolones and carbapenem.

Results: We found reduced use of Ceftriaxone as many as 890 ampules (37.11%), for Cefotaxime the reduction was 580 ampules (67.13%); while the use of Cefoperazone reduced as many as 76 ampules (47.50%) and Ceftazidime reduced as many as 10 ampules (7.14%). The use of Ciprofloxacin reduced as many as 327 ampules (71.40%), but there was a drastic increase in the use of Levofloxacin as many as 59 ampules (>100%). The use of Carbapenems increased, which included 79 ampules (34.20%) for Meropenem; while the use of Imipenem increased as many as 9 ampules (100%). In three months after the implementation of RASPRO concept, 92.5% prophylaxis antibiotic had been given for appropriate indication and the antibiotic use of Cefazolin 71.3%. Within three months before and after the implementation of RASPRO concept, there was a total reduction of antibiotic use, which reached 1736 ampules (40.57%).

Conclusion: In conclusion, the implementation of RASPRO concept can be executed as an effort to reduce the quantity of antimicrobial use in hospitals. However, larger studies and longer monitoring are required in order to identify the impact of implementation of RASPRO concepts at a hospital.

Disclosure of Interest
None declared.

(MANUAL Model)

Qualitative Evaluation of Antibiotic with Gyssens Method by RASPRO Concept for Pneumonia at Pediatric Intensive Care Unit

Rinna W. Sundariningrum,¹ Darmawan Budi Setyanto,² Ronald Irwanto Natadidjaja³

Background. Pneumonia remains the commonest infective reason for admission to intensive care as well as being the most common secondary infection acquired whilst in the pediatric intensive care unit. Inappropriate use of antibiotics can increase morbidity, mortality, patient cost, and antibiotic resistance.

Objective. To qualitatively evaluate antibiotic use in pneumonia with The Gyssens method by RASPRO concept.

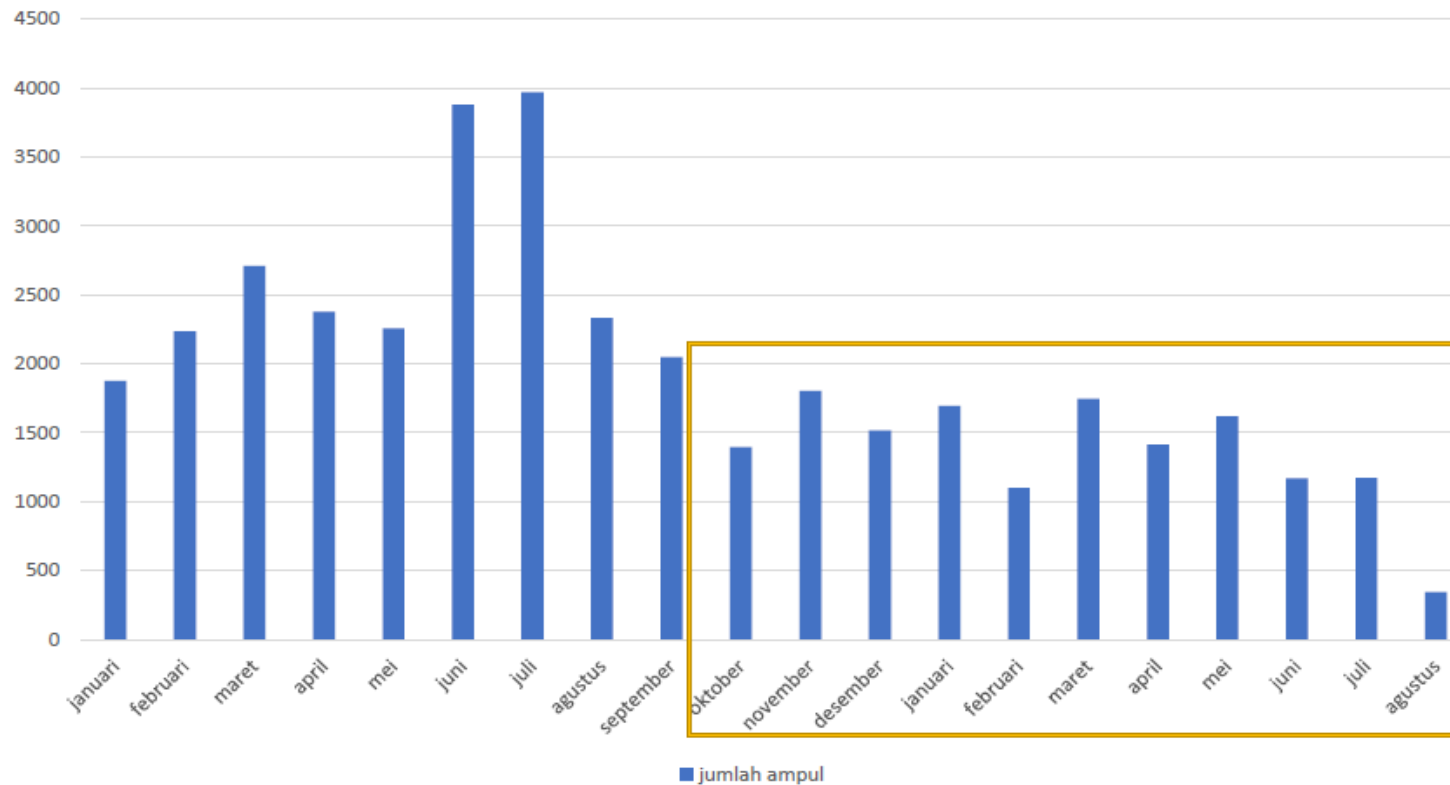
Methods. We performed a descriptive, retrospective study data based on medical records of patients with pneumonia who admitted to the pediatric intensive care unit in Hermina Bekasi Hospital from May to October 2019. Records were evaluation its qualitative antibiotic using the Gyssens method by RASPRO concept.

Result. This study discovered 51 cases (14,46%) of severe pneumonia. We found 119 antibiotics uses including 90 (75,63%) empirical therapies and 29 (24,37%) devinitive therapies. Ampicilin sulbactam was the most common antibiotic used (15,98%), followed by cefotaxime (15,12%), meropenem (13,44%), azithromycin (11,78%) and ceftriaxone (10,92%). Based on Gyssens method by RASPRO concept, appropriate antibiotic use (category 0) accounted for 63,02%, while inappropriated use accounted for 1,68% category IVa (improper; other antibiotics were more effective), 22,69% category IIIa (improper; duration too long), 9,24% category IIIb (improper; duration too short) and 3,36% category IIa (improper; incorrect dose).

Conclusion. Appropriate use of antibiotics showed quite good results, namely 63,03%. The RASPRO concept can be used to reduce subjectivity bias in qualitative antibiotic assessments by the Gyssens method for pneumonia treated in the pediatric intensive care unit. **Sari Pediatri** 2020;22(2):109-14

9 months before & after using digital ASP model

43% decline of Inpatient Antibiotic Usage



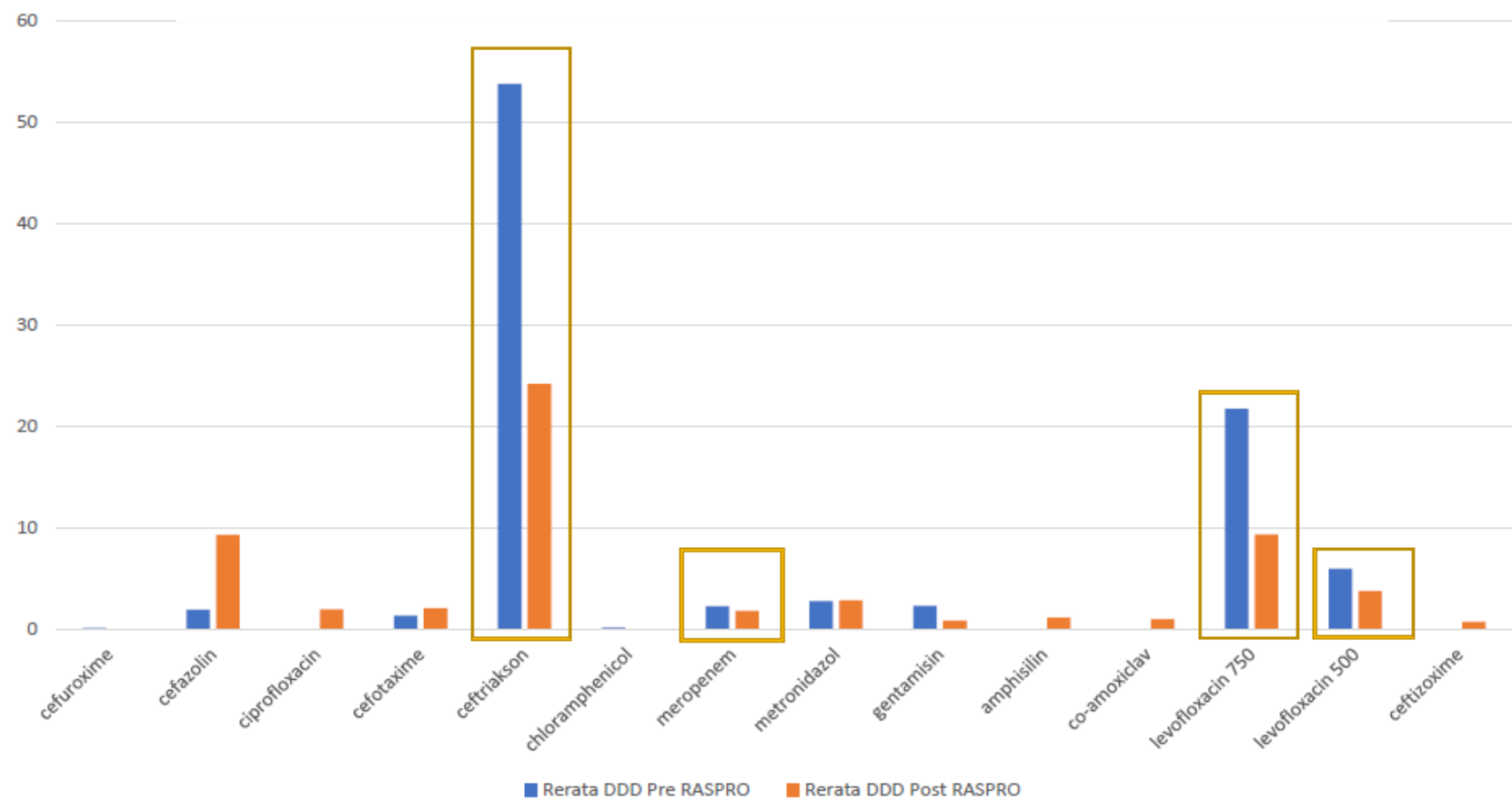
Dr. Iin Indra Pertiwi SpPD

RASPRO Indonesia - Indonesian Grass Root Meeting on Antimicrobial Stewardship (INDOGRAM)
World Antimicrobial Awareness Week, November 2022

To do further research in 3 hospitals , In progress publication

(Digital Model)

9 months before & after using digital ASP model : average of DDD



20% Define Daily Dose (DDD) Decline of Meropenem
57% Define Daily Dose (DDD) Decline of 750mg Levofloxacin
37% Define Daily Dose (DDD) Decline of 500mg Levofloxacin
55% Define Daily Dose (DDD) Decline of Ceftriaxone

Dr. lin Indra Pertiwi SpPD

RASPRO Indonesia - Indonesian Grass Root Meeting on Antimicrobial Stewardship (INDOGRAM)
World Antimicrobial Awareness Week, November 2022

To do further research in 3 hospitals , In progress publication

(Digital Model)



Trend Changing to the ACCESS Category Antibiotic Usage after Digital Antimicrobial Stewardship Tool e-RASPRO 9 Months Implementation in an Indonesian Hospital

Hadiani Adlani^{1,2}, Aziza Ariyani², Ronald Irwanto Natadidjaja^{1,2,3}, Anti Dharmayanti^{1,2}

¹ Indonesian Society of Infection Control (INASIC) Branch Banten

² RASPRO Indonesia *Study Group*

³ Faculty of Medicine Universitas Trisakti

Background: Antimicrobial Stewardship Program (ASP) is a global issue. World Health Organization (WHO) stated, there are 3 categories of antimicrobial: ACCESS, WATCH, and RESERVE. e-RASPRO as a digital ASP may alter antibiotic prescribing pattern by prioritizing ACCESS category as suggested by WHO.

Methods: This manuscript was a ward retrospective survey data of 9 months Define Daily Dose (DDD) average before-after implementing the electronic-RASPRO (e-RASPRO) on ACCESS & WATCH antibiotic.

Results: Number of inpatients 9 months before-after e-RASPRO implementation were 7,754 and 6,794. Within 9 months after implementing e-RASPRO there was a trend of antibiotic prescription shifting from WATCH category antibiotic to ACCESS category antibiotic. There was a trend of reduced Define Daily Dose (DDD) average of WATCH category antibiotic. 24.82% of 3rd generation Cephalosporin, 33.20% of Quinolones, 14.76% of Carbapenems and 100% of Piperacillin Tazobactam DDD average were reduced. While, in ACCESS Category Antibiotic, there were an elevation of Penicillin and Aminoglycosides DDD average up to 528.66% and 137.66%.

Conclusion: There are trend changing of DDD average from WATCH to ACCESS category antibiotic following the 9 months implementation of e-RASPRO. We need further study to judge the effectiveness of e-RASPRO as a digital ASP tools.



A Survey on Define Daily Dose of Watch- and Access-Category Antibiotics in Two Indonesian Hospitals Following the Implementation of Digital Antimicrobial Stewardship Tool

Ronald Irwanto Natadidjaja, Aziza Ariyani, Hadiani Adlani, Raymond Adianto, Iin Indah Pertiwi, Grace Nerry Legoh, Alvin Lekonardo Rantung, Hadi Sumarsono

Background: In 2023, the World Health Organization (WHO) began targeting a shift in antibiotic prescribing trends from WATCH to ACCESS category.

Method: This survey was a preliminary study, in which our study group designed a digital model of antimicrobial stewardship and the model was known as e-RASPRO. The survey on the use of antibiotic Define Daily Dose (DDD) was carried out in two hospitals in Indonesia at 3 months and 9 months of use, respectively. Data was retrieved retrospectively at the inpatient wards of both hospitals.

Result: Three months before and after the implementation of e-RASPRO in Hospital 1, the DDD of prophylactic antibiotic Cephazolin showed an increased of 167.18%. In hospital 2, Cephazolin had been used since the hospital applied the manual RASPRO concept. DDD of WATCH category antibiotics within 9 months following the implementation of e-RASPRO tool in hospital 1 showed a decrease of 49.01%. Meanwhile, the implementation of e-RASPRO for 3 months in Hospital 2 still showed an increase in WATCH category antibiotics by 20.18%; however, there was a decrease in DDD of Cephalosporin and Glycopeptide antibiotics by 7.63% and 49.30%, respectively. In the meantime, as a way of saving antibiotic use and shifting antibiotic prescribing to the ACCESS category, we found a decrease in DDD of ACCESS category antibiotics in Hospital 1 by 3.64% and an increase in Hospital 2 by 8.14%.

Conclusion: The survey may indicate that there are savings attempts in antibiotic use as well as an early change in DDD antibiotics from the WATCH category to the ACCESS category following the implementation of e-RASPRO tool in both hospitals. The time period of using the digital devices may still affect the results; however, this survey certainly has not illustrated a strong cause-and-effect correlation between the use of e-RASPRO tool and antibiotic DDD.

(Digital Model)

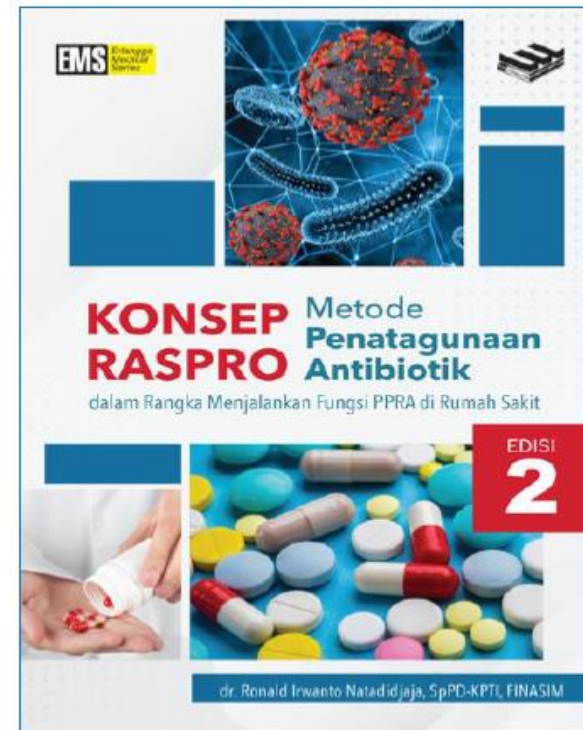
RASPRO Manual Concept for Running Antimicrobial Stewardship

In House Training

INDONESIA

RSIA Kemang
RSUD Kebayoran Baru
RS Tugu Ibu
RS Marzoeki Mahdi Bogor
RS Bunda Thamrin Medan
RS UNHAS Makassar
RS Hermina Group (40 Hospitals) – 6 Batch
RS Mayapada Group (8 Hospitals) – 1 Batch
RS Primaya Group (6 Hospitals) – 1 Batch
RS Pertamina Group (6 Hospitals) – 1 Batch
RS Otak Bukit tinggi
RS Advent Bandung
RS. Bunda Group (8 Hospitals) – 1 Batch
RS Mardi Rahayu

RS. Awal Bros Group (8 Hospitals)
RS Ummi Bogor
RSUD Wangaya Bali



e-RASPRO Digital Antimicrobial Stewardship Implementation INDONESIA

HERMINA HOSPITAL GROUP - INDONESIA

27 User Hospitals with Centralized Monitoring in Jakarta

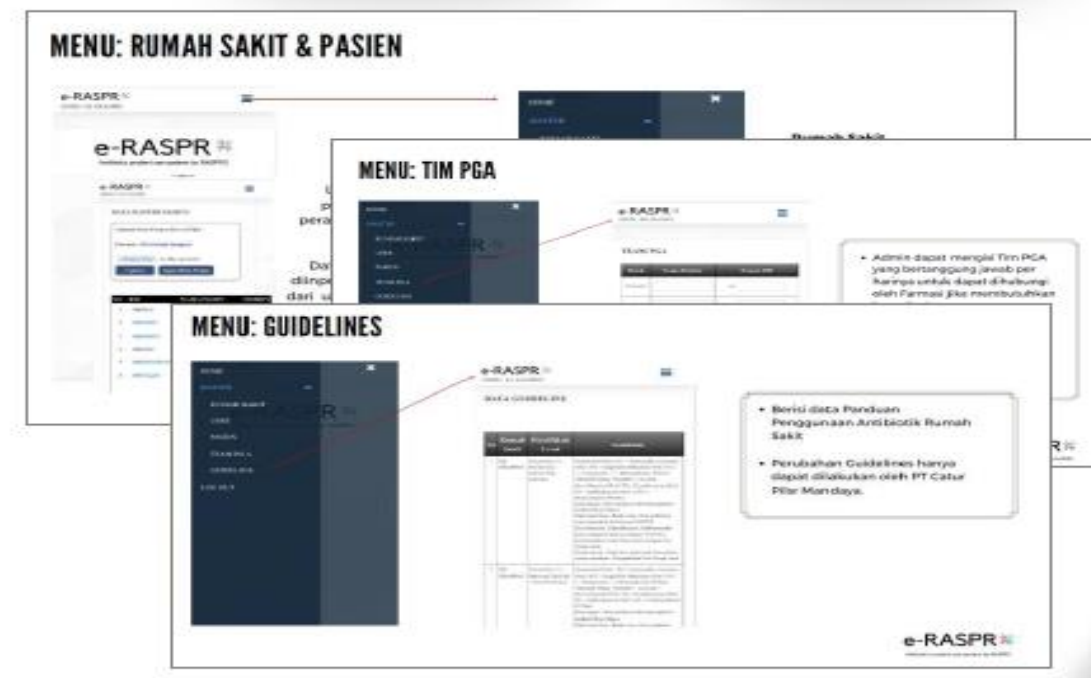
RS. Hermina Jatinegara	RS. Hermina Jogjakarta
RS. Hermina Grand Wisata	RS. Hermina Solo
RS. Hermina Bogor	RS. Hermina Tangkuban Perahu
RS. Hermina Galaxy	RS. Hermina Padang
RS. Hermina Bekasi	RS. Hermina Pasteur
RS. Hermina Daan Mogot	RS. Hermina Arcamanik
RS. Hermina Ciputat	RS. Hermina Sukabumi
RS. Hermina Kemayoran	RS. Hermina Karawang
RS. Hermina Tangerang	RS. Hermina Bitung
RS. Hermina Ciruas	RS. Hermina Purwokerto
RS. Hermina Serpong	RS. Hermina Bitung
RS. Hermina Depok	
RS. Hermina Banyumanik	
RS. Hermina Pandanaran	
RS. Hermina Makassar	
RS. Hermina Ubaya	

RS Tugu Ibu
(e-RASPRO Beta Version mode)

RS Mardi Rahayu

RS. Marzoeki Mahdi

RSUD Cempaka Putih



In progress Publication

Original Article

A Quantitative Survey on Antibiotic Prescribing Pattern in Three Indonesian Hospitals using Digital Antimicrobial Stewardship Tool (e-RASPRO)

Ronald Irwanto Natadidjaja^{1,2}, Aziza Ariyani¹, Hadiani Adlani^{1,3,4}, Raymond Adianto¹,
Iin Indra Pertiwi⁵, Grace Nerry Legoh⁶, Alvin Rantung⁶, Dianawati⁵, Sri Mulyani⁴,
Ronaningtyas Maharani⁴, Desi Anggiat⁴, Triyoko Septio Marja⁴, Hadi Sumarsono¹

¹RASPRO Indonesia Study Group, ²Faculty of Medicine, Trisakti University, ³Faculty of Medicine, Syarif Hidayatullah Islamic University, ⁴Herminal Hospital Group Indonesia, ⁵Tugu Ibu Hospital, ⁶Advent Bandung Hospital

National Taiwan University Hospital – June 2024



Xie Xie

THANK YOU

Terima Kasih

www.new.rasproindonesia.com

诚 正 信 实

Sincerity Honesty Trust Earnestness