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# THE ROLE FOR PHARMACY EDUCATION TO OVERCOME THE PROBLEM ON ANTIMICROBIAL RESISTANCE

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# Outline



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- AMR data from time to time
- Report from ongoing surveillance
- Contribution of Pharmacy Education to reduce AMR
- Learning outcome of each level of education
- Recommendation

## Global Surveillance Of Antibiotic Resistance Conducted By World Health Organization (WHO)



The incidence of antibiotic resistance increased sharply during 2013 to 2014 in the Asian continent, with the highest number in Southeast Asia and occurring in almost all antibiotic groups.

Earnshaw et al., 2013; WHO, 2014

# Research Conducted in Indonesia in 2001-2002



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**84%**  
antibiotic  
prescribing

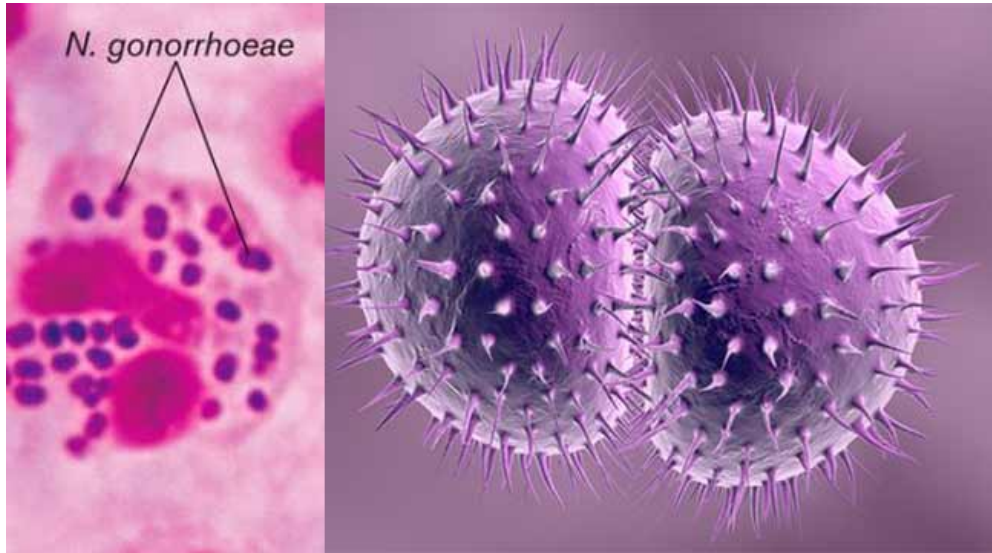
**2**  
Public Hospitals  
In Indonesia

**40%**  
antibiotics  
prescribed  
without indication  
of infection

# Research conducted by the University of California in Bali in 2004



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<http://bacteriologynotes.com/habitat-and-morphology-of-neisseria-gonorrhoeae/>

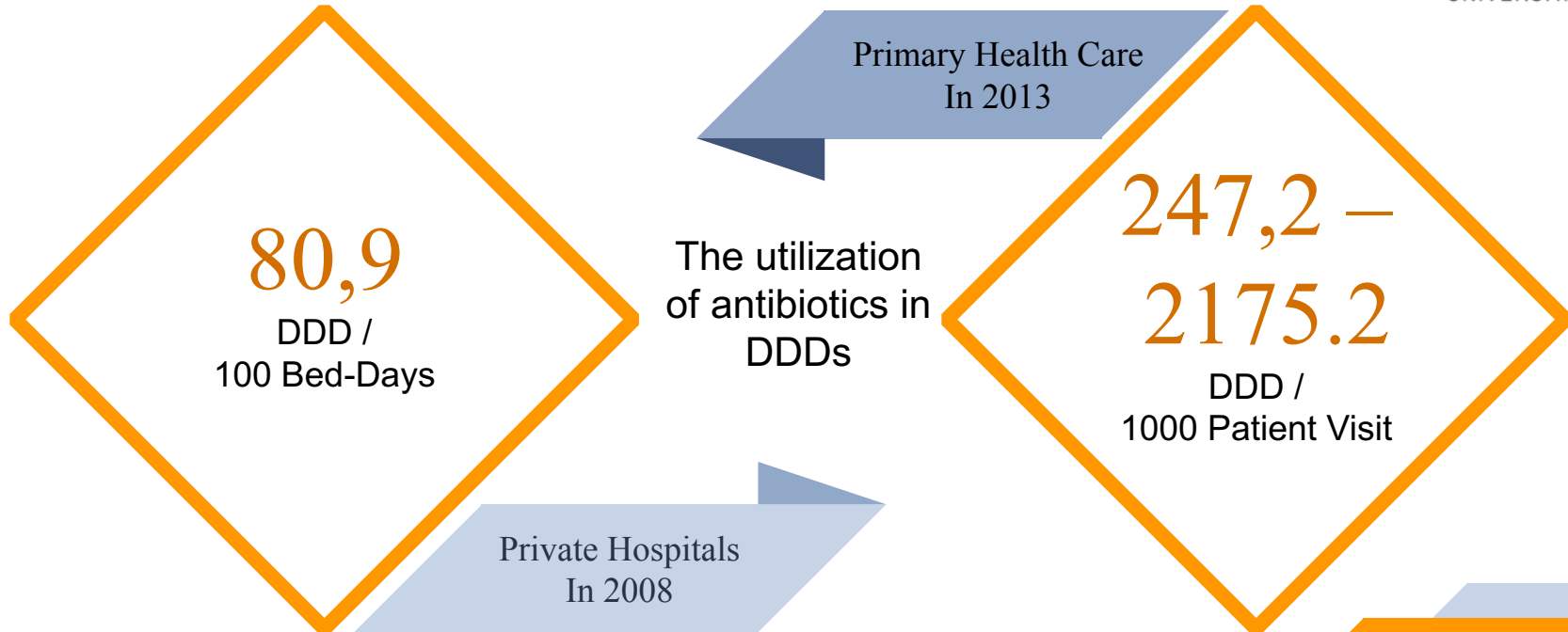
*Neisseria gonorrhoeae* is not only resistant to first-line antibiotics (79.1% resistant to penicillin) but also resistant to second-line antibiotics (40.1% isolates resistant to fluoroquinolone).

Donegan et al., 2006

# Research Conducted By University of Surabaya in Surabaya, 2008-2010 and 2013



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Ministerial Decree No. 8 (2015) states that every hospital should implement an Optimal Antimicrobial Resistance Control Program.

# Pharmacy Education



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Need to contribute to reduce AMR by

- Preparing integrated curricula to produce pharmacists that will be ready to be part of AMRC Program.
- Conducting research to find the problem and encourage the development of national antibiotic usage policy
- To serve community by implementing national formulary and health promotion program planning to control the incidence of antibiotic resistant.



# Pharmacy Education



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## Local Scale

- ✓ recommendations for rational use of antibiotics
- ✓ development of antibiotic therapy guidelines in hospitals
- ✓ as parameters of adherence to health workers in running antibiotic stewardship programs in hospitals

## EFFECTIVE SURVEILLANCE

- ✓ Collecting publicly available, comparable, and reliable data on antibiotic use
- ✓ For the development of health professionals, the results data from surveillance is very useful for Pharmacy Higher Education for the development of learning outcomes to build their curriculum to prepare AMR Program Pharmacists.

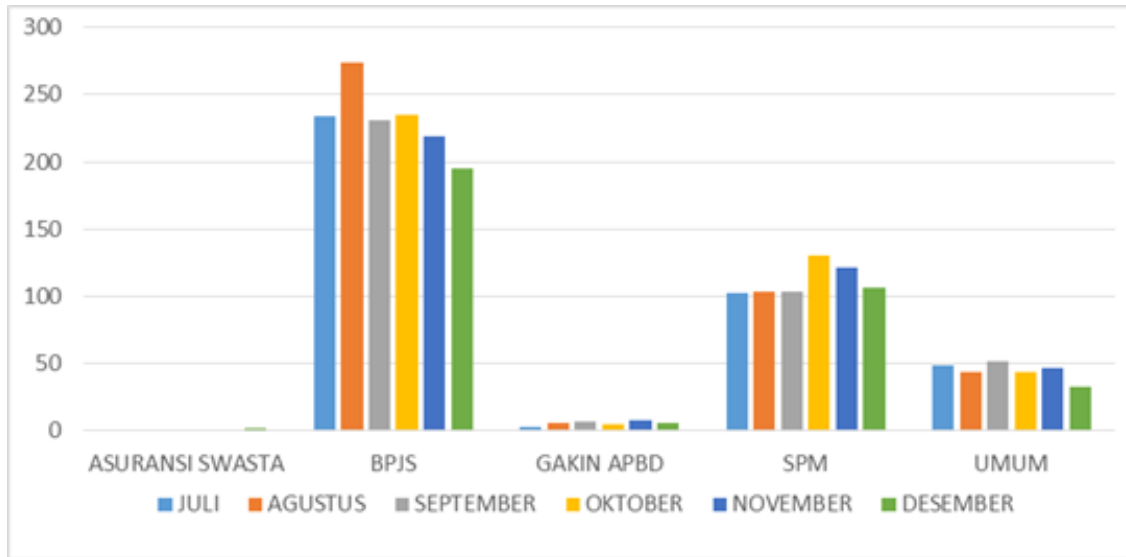
## National Scale

# Surveillance in Bangil Public Hospital, Pasuruan, East Java (July-December 2016)



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5 groups based on financial sources on getting their medication



**59% medication** were  
BPJS financing



## 5 groups of patient based on the diagnoses

<b>DIAGNOSES</b>	<b>Number of patients</b>	<b>Percentage</b>
<b>Delivery by emergency caesarean section</b>	<b>801</b>	<b>33.94%</b>
Supervision of high-risk pregnancy	359	15.21%
Premature rupture of membranes	301	12.75%
Spontaneous Vertex delivery	295	12.50%
Severe pre-eclampsia	224	9.49%



## 5 most uses antibiotics

Antibiotics	DDD/100 Bed-Days	Percentage
<b>J01DB05, Cefadroxil</b>	<b>11.64</b>	<b>40.40%</b>
J01CA04, Amoxicillin	9.45	32.81%
J01DB04, Cefazolin	1.56	5.40%
J01DC02, Cefuroxime	1.46	5.07%
J01CR01, Ampicillin/Sulbactam	1.30	4.52%

Average: 28.80 DDD/100 BD. Bangil Hospital has an antibiotic stewardship team since 22 March 2016



## 5 groups of patient based on the diagnoses

<b>DIAGNOSES</b>	<b>Number of patients</b>	<b>Percentage</b>
<b>Certain infectious and parasitic disease</b>	<b>336</b>	<b>23.38%</b>
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	315	21.92%
Diseases of the digestive system	214	14.89%
Endocrine, nutritional and metabolic disease	195	13.57%
Diseases of the circulatory system	139	9.67%



## 5 most uses antibiotics

<b>Antibiotics</b>	<b>DDD/100 Bed-Days</b>	<b>Percentage</b>
<b>J01DD04, Ceftriaxone</b>	<b>12.99</b>	<b>25.09%</b>
J01MA12, Levofloxacin	6.58	12.71%
J01XD01, Metronidazole	5.99	11.56%
J01CR01, Ampicillin/Sulbactam	5.23	10.09%
J01MA02, Ciprofloxacin	4.60	8.87%

Average: 51.78 DDD/100 BD. Bangil Hospital has an antibiotic stewardship team since 22 March 2016



## 5 groups of patient based on the diagnoses

<b>DIAGNOSES</b>	<b>Number of patients</b>	<b>Percentage</b>
<b>Fever, unspecified</b>	<b>153</b>	<b>18.48%</b>
Diarrhoea and gastroenteritis of presumed infectious origin	132	15.94%
Dengue haemorrhagic fever	129	15.58%
Bronchopneumonia, unspecified	106	12.80%
Febrile convulsions	86	10.39%



## 5 most uses antibiotics

<b>Antibiotics</b>	<b>DDD/100 Bed-Days</b>	<b>Percentage</b>
<b>J01CA01, Ampicillin</b>	<b>9.09</b>	<b>24.61%</b>
J01CA04, Amoxicillin	6.87	18.60%
J01DD04, Ceftriaxone	3.53	9.56%
J01BA02, Thiamphenicol	3.40	9.20%
J01BA01, Chloramphenicol	3.33	9.01%

Average: 36.95 DDD/100 BD. Bangil Hospital has an antibiotic stewardship team since 22 March 2016





## 5 most uses antibiotics

Antibiotics	DDD/100 Bed-Days	Percentage
<b>J01MA02, Ciprofloxacin</b>	<b>7.08</b>	<b>27.21%</b>
J01DD02, Ceftazidime	3.69	14.18%
J01DD08, Cefixime	2.39	9.20%
J01XD01, Metronidazole	2.28	8.77%
J01GB03, Gentamicin	1.88	7.21%

Average: 26.02 DDD/100 BD. Bangil Hospital has an antibiotic stewardship team since 22 March 2016

# Studies in surgery ward in a Public Hospital and two private hospital (2016)



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	<b>Public Hospital</b>	<b>Private Hospital A</b>	<b>Private Hospital B</b>
Number of patients	3016	350	343
Utilizations, DDDs	4073.5	508.5	567.0
DDD/patient	1.35	1.5	1.7

Public Hospital has an antibiotic stewardship team since 22 March 2016

Private Hospital A didn't have any antibiotic stewardship team

Private Hospital B has an antibiotic stewardship team since 1 November 2016

# Methods



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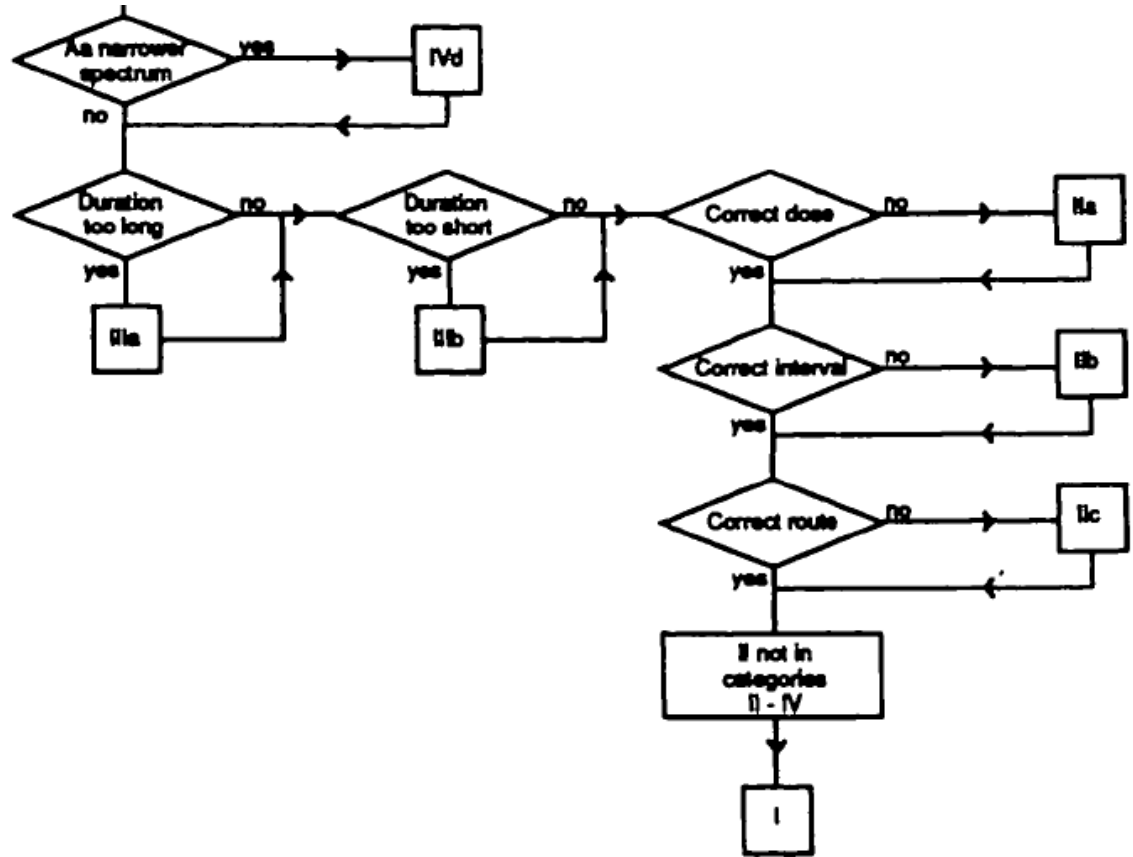
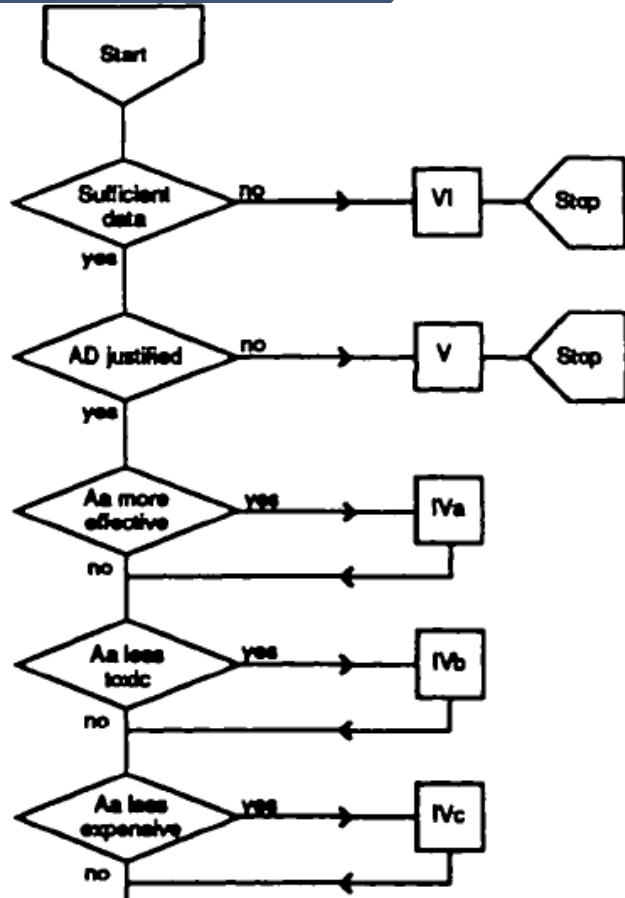
## Local Scale

- ✓ recommendations for rational use of antibiotics
- ✓ development of antibiotic therapy guidelines in hospitals
- ✓ as parameters of adherence to health workers in running antibiotic stewardship programs in hospitals

## QUALITY OF USE

- ✓ for the development of national antibiotic usage policy such as the implementation of national formulary and health promotion program planning to control the incidence of antibiotic resistan.
- ✓ For the development of health professionals, the results data from surveillanace is very useful for Pharmacy Higher Education for the development of learning outcomes to build their curriculum to prepare AMR Program Pharmacists.

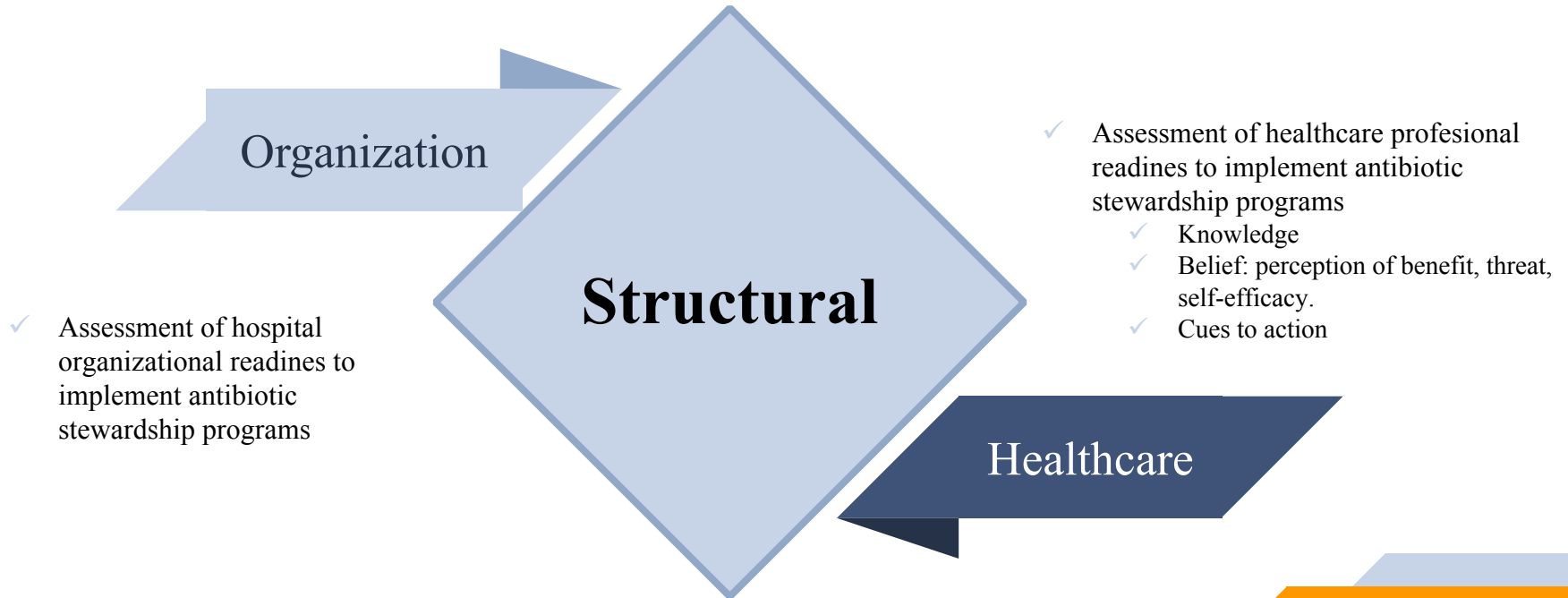
## National Scale



## Studies in a Private Hospital, Surabaya, Indonesia (2006)

Gyszen category	Percentage
VI (insufficient data)	0
V (no antibiotic justified)	0
IV (antibiotic less effective, more toxic, more expensive, broad spectrum)	48,6
IIIa (duration too long)	2,9
IIIb (duration too short)	40,0
IIa (incorrect dose)	85,7
IIb (incorrect interval)	60,0
IIc (incorrect route)	0
I (not category II – VI)	11,4

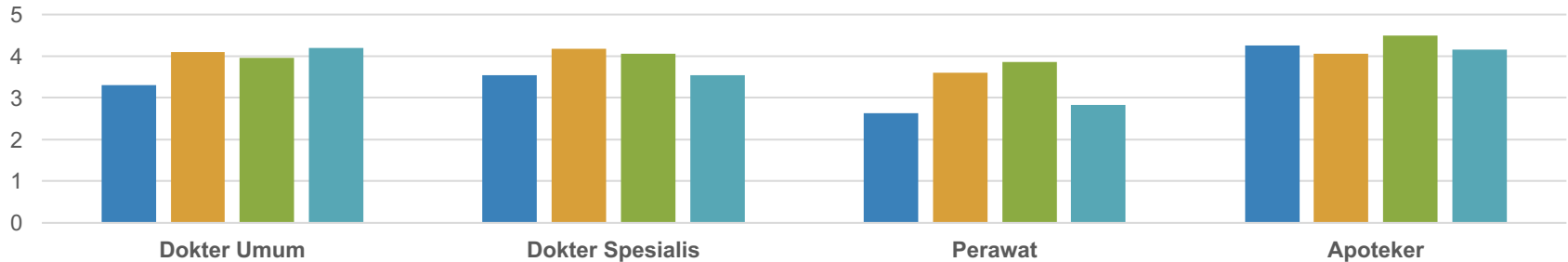
# Methods



# Studies in a Public Hospital, Sidoarjo, Indonesia (2016)

**Knowledge (Mean)**

## Knowledge

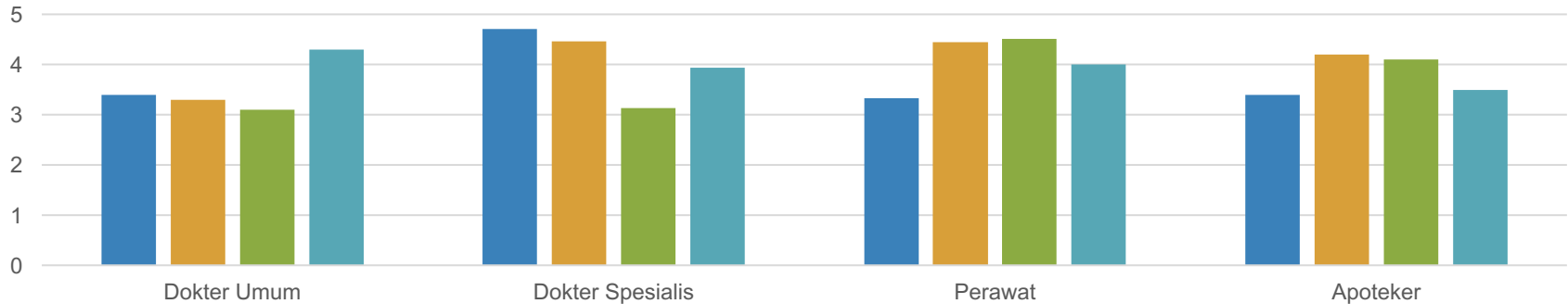


- Saya tidak mengetahui prevalensi bakteri resisten antibiotik di rumah sakit.
- Saya tidak mengetahui tujuan dibentuknya PPRA di rumah sakit ini
- PPRA dibentuk untuk menekan prevalensi kejadian resistensi antibiotik
- Resistensi antibiotik merupakan permasalahan di rumah sakit ini

# Studies in a Public Hospital, Sidoarjo, Indonesia (2016)

## Perceived Threat (Mean)

### Perceived Threat

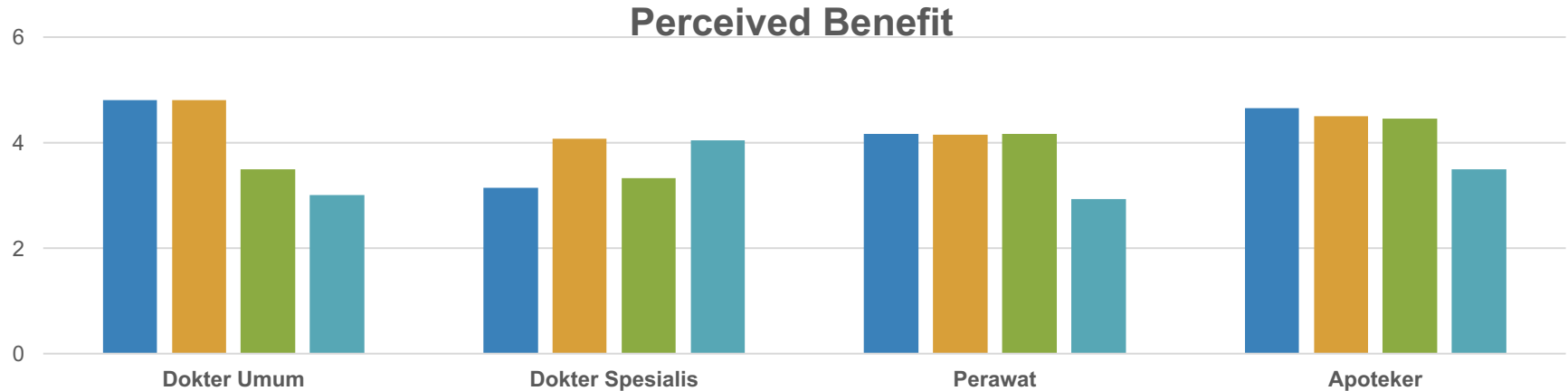


- Menurut saya, bakteri resisten antibiotik dapat sangat berbahaya bagi saya
- Menurut saya, resistensi antibiotik dapat sangat berbahaya bagi pasien saya
- Menurut saya, profesi saya saat ini memiliki resiko yang sangat tinggi untuk terinfeksi bakteri resisten antibiotik
- Saya dapat menularkan bakteri resisten antibiotik kepada pasien saya



# Studies in a Public Hospital, Sidoarjo, Indonesia (2016)

## Perceived Benefit (Mean)



■ Saya percaya bahwa PPAB dapat menjadi salah satu sumber rekomendasi terapi yang sangat bermanfaat bagi saya

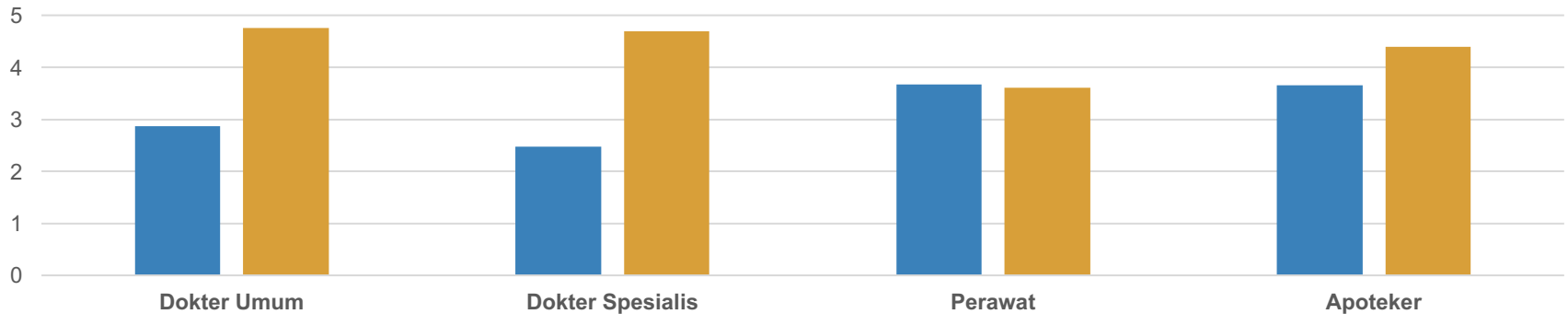
■ Saya percaya bahwa antibiogram dapat menjadi salah satu sumber rekomendasi terapi yang sangat bermanfaat bagi saya

■ Rekomendasi terapi antibiotik yang diberikan oleh apoteker di rumah sakit ini sangat membantu pekerjaan saya

# Studies in a Public Hospital, Sidoarjo, Indonesia (2016)

*Perceived Barrier (Mean)*

Perceived Barrier

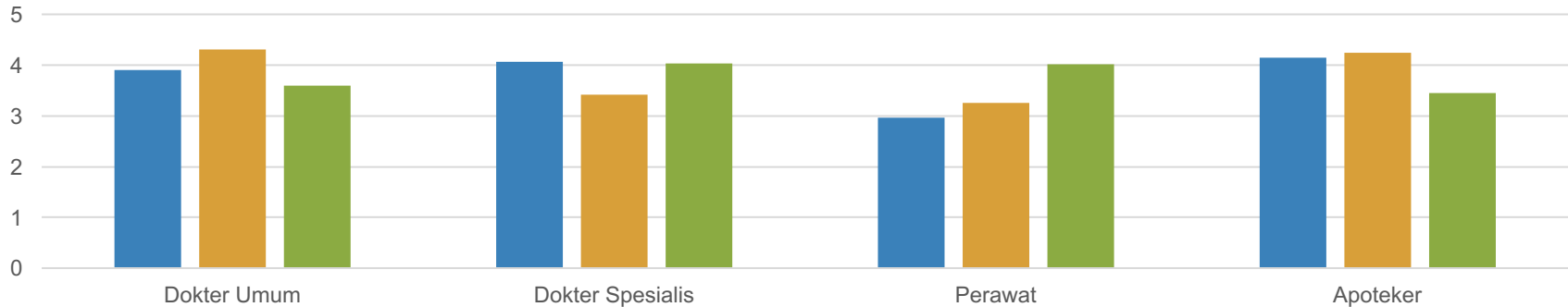


■ Saya akan patuh terhadap pedoman terapi apabila teman sejawat saya juga melakukannya.

# Studies in a Public Hospital, Sidoarjo, Indonesia (2016)

## Self-efficacy (Mean)

### Self-efficacy



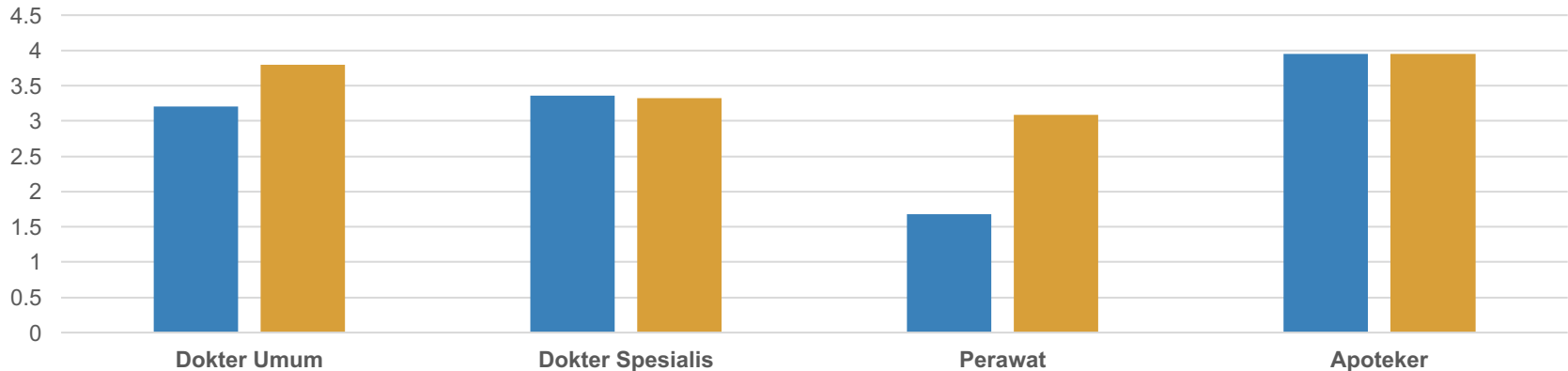
■ Saya memiliki kompetensi yang cukup untuk melakukan telaah ketepatan persepsian antibiotik

■ Saya bersedia untuk berpartisipasi dalam berbagai strategi yang berhubungan dengan program pengendalian resistensi antibiotik

# Studies in a Public Hospital, Sidoarjo, Indonesia (2016)

***Cues to action (Mean)***

Cues to action



■ Sosialisasi yang diberikan oleh tim PPRA sangat membantu saya dalam memahami resistensi antibiotik

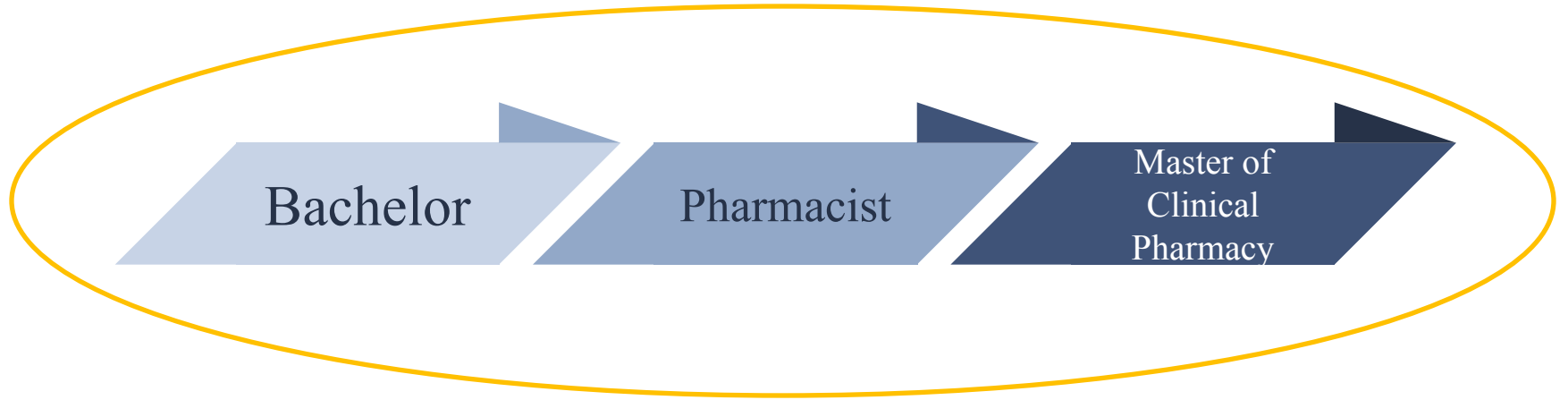
■ Saya akan patuh terhadap peraturan yang dibuat oleh PPRA karena merupakan mandat dari Direktur Rumah Sakit

## CURRENT RESULTS



- Ongoing results showed that
1. 20-40% patients received antibiotics
  2. Most of the patient financing their medication using BPJS
  3. Antibiotic route of administration mostly parenteral and oral
  4. The most common used antibiotic varies among hospitals and among areas
  5. Lack of sufficient data for mapping of germs in hospitals
  6. Sustainable Antibiotic surveillance need to be done frequently

# Outcomes



**AMIR**

## Attitude

have attitude of pharmacist to implement antimicrobial stewardship.

## Knowledge

have basic knowledge of pharmacist to implement antimicrobial stewardship.

## Skills

Able to assess the prescription in accordance with national and local policies for antimicrobial use, review the antimicrobial duration, give advice on dosage, preparation and administration.

- ✓ able to advise patients on the proper use of antimicrobials, counsel individuals and populations on the safe and rational use of antimicrobials (including the selection, use, contraindications, storage, and side effects), accurately dispense antimicrobials for prescribed and/or minor infections, ensure appropriate medicines, route, time, dose, documentation, action, form and response for individual patients.
- ✓ Involved in monitoring antimicrobial use.
- ✓ Able to conduct measurement of antimicrobial consumption and provide efficacy data for clinical benefit for each indication.



# Master of Clinical Pharmacy

- ✓ Able to conduct risk assessment and understand the application of standard and transmission-based precautions, with special focus on hand hygiene.
- ✓ Able to master all strategy to prevent infection at community and health facility levels, e.g. WASH and immunization.
- ✓ Able to have specific skills such as able to develop concept and manage qualified clinical pharmacy services in hospital and community in the field of surgery, common disease, cardiovascular, respiratory, liver, gastrointestinal tract, kidney, urinary tract, joint and muscle, neurology and psychiatry
- ✓ Able to indentify, plan and develop the concept and resolve drug related problem to achieve rational drug therapy, holistic and improve patients quality of life
- ✓ Able to identify, plan, and develop the concept and conduct drug information services and evidence-based medication to provide health services ranging from preventive, promotive, curative and rehabilitative for patients, health care professionals, and community.

## RECOMMENDATIONS



**Pharmacy higher education needs to play an active role in helping society to increase awareness and help prevent antimicrobial resistance (AMR).**



**THANKYOU!**