Antimicrobial Resistance Control Program (ARCP)

“A SELF IMPROVEMENT PROGRAM”
in Indonesia
Introduction

Infectious diseases remain the main problem in Indonesia

– Standard management of the hospital
– Inadequate antimicrobial therapy
– Selection of antibiotics usage
  – Effectiveness
  – Safety
  – Cost
Antimicrobial Resistance

- **A worldwide problem**\(^1\)
- Associated with **increased morbidity, mortality, and hospital costs**\(^1\)
- **Occurs** in both hospitals *and* the community\(^2\)

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AMRIN Study
Antimicrobial Resistance in Indonesia: Prevalence and Prevention

• Period: 2000 – 2005

• Representative hospital
  – Dr. Kariadi hospital
  – Dr. Soetomo hospital
  – Collaboration with
    • LUMC/NUMC/Erasmus (The Netherland)
What AMRIN study do?

- **Background**
  - To prove and measure prevalence of AMR in Indonesian hospital
  - To identify of antibiotic use profile
  - To enhance the understanding of AMR by academic research based → Evidence-based validated data
  - To identify the development of AMR by transmission in hospital setting
1. Antimicrobial resistance identification
   • Indicator: *S. aureus* dan *E. Coli*
   • Sample from: Nasal and perineum
   • Antibiotic test: betalactam, aminoglicosyde, macrolide
   • NCCLS/CLSI (disk diffusion test on Mueller Hinton agar)
   • Periode: 3-4 months
2. Antibiotic Usage
   • Validation of retrospective determination
   • Quantity measured retrospective & prospective $\rightarrow$ DDD/100 patient day
   • Quality $\rightarrow$ assessment of antibiotic prescriptions use Inge Gyssens method

3. Infection control
   • Prevalence of Health Care Associated Infection
   • Level of knowledge, attitude and behaviour regarding Infection control
# Antibiotic usage profile

**dr. Soetomo / dr. Kariadi hospital**

<table>
<thead>
<tr>
<th>Category</th>
<th>Evaluator range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sby (%)</td>
</tr>
<tr>
<td>No indication (treatment)</td>
<td>45 - 76</td>
</tr>
<tr>
<td>No indication (prophylaxis)</td>
<td>13 - 55</td>
</tr>
</tbody>
</table>

*AMRIN STUDY, 2005*
Resistance in Indonesia

Table. Antimicrobial resistance rates (%) of *S. aureus* and *E. coli* derived from different cohorts in two Indonesian urban cities

<table>
<thead>
<tr>
<th></th>
<th>Admission</th>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Surabaya</td>
<td>Semarang</td>
<td>Surabaya</td>
<td>Semarang</td>
<td>Surabaya</td>
<td>Semarang</td>
</tr>
<tr>
<td><em>S. aureus</em></td>
<td></td>
<td>(n = 39)</td>
<td>(n = 31)</td>
<td>(n = 39)</td>
<td>(n = 32)</td>
<td>(n = 35)</td>
<td>(n = 31)</td>
</tr>
<tr>
<td>Tetracycline</td>
<td></td>
<td>44&lt;sup&gt;d&lt;/sup&gt;</td>
<td>23</td>
<td>33</td>
<td>6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>29</td>
<td>14</td>
</tr>
<tr>
<td>Oxacillin</td>
<td></td>
<td>20&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Gentamicin</td>
<td></td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Erythromycin</td>
<td></td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td></td>
<td>18&lt;sup&gt;d&lt;/sup&gt;</td>
<td>16</td>
<td>5</td>
<td>9</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>SXT</td>
<td></td>
<td>26&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13</td>
<td>3</td>
<td>17</td>
<td>0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td></td>
<td>(n = 389)</td>
<td>(n = 433)</td>
<td>(n = 388)</td>
<td>(n = 396)</td>
<td>(n = 383)</td>
<td>(n = 431)</td>
</tr>
<tr>
<td>Gentamicin</td>
<td></td>
<td>5&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3</td>
<td>16&lt;sup&gt;b&lt;/sup&gt;</td>
<td>21&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td></td>
<td>30&lt;sup&gt;d&lt;/sup&gt;</td>
<td>22&lt;sup&gt;a,d&lt;/sup&gt;</td>
<td>39&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>10</td>
<td>6&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>SXT</td>
<td></td>
<td>43&lt;sup&gt;d&lt;/sup&gt;</td>
<td>40&lt;sup&gt;d&lt;/sup&gt;</td>
<td>52</td>
<td>59&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>Ampicillin</td>
<td></td>
<td>49&lt;sup&gt;d&lt;/sup&gt;</td>
<td>52&lt;sup&gt;d&lt;/sup&gt;</td>
<td>66&lt;sup&gt;b&lt;/sup&gt;</td>
<td>80&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td></td>
<td>3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1</td>
<td>9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td></td>
<td>8&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4</td>
<td>18&lt;sup&gt;b&lt;/sup&gt;</td>
<td>27&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

AMRIN STUDY 2004
Percentage of *E. coli* resistant to Gentamycin & Cefotaxim

Percentage of *E. coli* resistant to Fluoroquinolone

AMRIN STUDY, 2005
‘clinical’ ESBL in Indonesia?

- prospective clinical study January - April 2005
- Dr Soetomo hospital, Surabaya
- *E.coli, K.pneumoniae*
- sources: urine, wounds, blood, stools, sputa
### ESBL in clinical isolates?

<table>
<thead>
<tr>
<th></th>
<th>E. coli</th>
<th>K. pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESBL positive</strong></td>
<td>73/355 (21%)</td>
<td>72/247 (29%)</td>
</tr>
<tr>
<td><strong>CTX-M-15:</strong></td>
<td>95%</td>
<td>56%</td>
</tr>
<tr>
<td><strong>SHV types:</strong></td>
<td>5%</td>
<td>44%</td>
</tr>
</tbody>
</table>
‘clinical’ ESBL in Indonesia?

- prospective clinical study February-March 2006
- Dr Kariadi hospital, Semarang
- *E. coli, K. pneumoniae*
- sources: urine, wounds, blood, stools, sputa
ESBL in clinical isolates?

**E.coli**

- 21/125 (16.8%) ESBL positive
  - CTX-M-15: 90%
  - SHV types: 10%

**K.pneumonia**

- 22/85 (25.8%) ESBL positive
  - CTX-M-15: 43%
  - SHV types: 57%
WHO Recommendation for Hospital

WHO Global Strategy for Containment Of Antimicrobial Resistance . WHO 2001
The AMRIN team
2005

MoH
Dit.Jen Bina Yan Medik

ARCP
Antimicrobial Resistance Control Program
1st National Workshop - Bandung
May, 29–31, 2005

“Strategy to Combat The Emergence & Spread of Antimicrobial Resistance Bacteria in Indonesia”
Recommendation of 1st National Workshop 2005
20 Teaching Hospitals in Indonesia should implement the AMR control as pilot project
the Guideline

Antimicrobial Resistance Control Program in Indonesia
The Ministry of Health
Strategy to Combat the Emergence and Spread of Antimicrobial Resistant Bacteria in Indonesia

1st National workshop
29-31 Mei 2005
Understanding of AMR

Hosp. Infra structure Audit

2nd national Workshop
6-7 December 2006.
ARCP Standardization - 20 hospitals

Assistance, follow up, supervision of ARCP implementation 2009 -2010

4th National Workshop
Final Report and evaluation of ARCP implementation
Expansion of ARCP implementation

3rd National Workshop
2010
Report and evaluation of ARCP implementation
ARCP

Objective

• To understand the risk of AMR among hospital staffs
• Controlling the emergence of AMR in Hospitals with prudent use of antibiotics
• Prevent the spread of AMR to implement universal precaution
Implementation Steps of ARCP in hospital

1. Develop ARCP Team (Hospital & Department level)
   - Clinical pharmacist
   - Clinical Microbiologist
   - Infection Control
   - Drugs & Therapeutic Committee
   - Physician

2. Review and update antibiotic guidelines based on recent hospital microbes pattern

3. To develop the update antibiotic guideline
Implementation Steps of ARCP in hospital

4. To conduct operational studies in order to obtain validated data in departments.
5. Data analysis and reporting
6. Re-update the antibiotic guidelines
7. Surveillance.
Key Performance Indicator (KPI)

1. Updated Antibiotic Guideline
2. Profile of antibiotic use
   A. quantitatif
      ▪ decrease number of antibiotic usage DDD/100 Patient day
   B. qualitatif
      ▪ Increase number of prudent use of antibiotic usage
3. Improvement of hospital pathogenecity
4. Surveillance for continual improvement
The Instrument for Evaluation of ARCP Implementation

Bekasi, 7-8 November 2008
Performance of 20 Teaching Hospital - 2010


<table>
<thead>
<tr>
<th>Category</th>
<th>score</th>
<th>%</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>93 - 115</td>
<td>81 - 100%</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>II</td>
<td>70 - 92</td>
<td>61 – 80%</td>
<td>10 (50%)</td>
</tr>
<tr>
<td>III</td>
<td>47 - 69</td>
<td>41 – 60%</td>
<td>4 (20%)</td>
</tr>
<tr>
<td>IV</td>
<td>24 - 46</td>
<td>21 – 40%</td>
<td>4 (20%)</td>
</tr>
<tr>
<td>V</td>
<td>0 - 23</td>
<td>0 – 20%</td>
<td>-</td>
</tr>
</tbody>
</table>
Hasil Evaluasi PPRA 20 RS Pendidikan Jan-Feb 2010

3rd National Workshop 2010
“Strategy to Combat The Emergence & Spread of Antimicrobial Resistant Bacteria in Indonesia”
Bandung, 19-21 April 2010
4th National Workshop 2011
Expansion of ARCP implementation
Yogyakarta 22-24 September 2011
## Rekomendasi LOKNAS IV

<table>
<thead>
<tr>
<th>REGULASI</th>
<th>EDUKASI</th>
<th>MANAJERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Menetapkan Kebijakan Nasional guna menghambat muncul dan penyebaran mikroba resisten di Indonesia.</td>
<td>• Meningkatkan kemampuan pelaksanaan PPRA melalui pertemuan ilmiah Nasional</td>
<td>• Membentuk POKJA Nasional Pengendalian Resistensi Antimikroba (POKJANAS-PPRA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Memberi dukungan koordinasi dan anggaran untuk bimbingan dan MONEV PPRA</td>
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</table>
Rekomendasi LOKNAS IV

<table>
<thead>
<tr>
<th>REGULASI</th>
<th>EDUKASI</th>
<th>MANAJERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Menetapkan pedoman nasional pelaksanaan PPRA</td>
<td>Meningkatkan kemampuan teknis penerapan PPRA, dengan cara : • Penyusunan modul pelatihan PPRA • Penyelenggaraan pelatihan berjenjang (TOT, advance trainer, MOT)</td>
<td>Memberikan dukungan anggaran untuk : 1. peningkatan kemampuan teknis perluasan jejaring PPRA 2. penyediaan sarana dan prasarana laboratorium mikrobiologi terkini 3. Penambahan SDM spesialis konsultan peny.infeksi, spesialis Mikrobiologi klinik, Farmakologi klinik dan Farmasi klinik</td>
</tr>
<tr>
<td>• Memperluas dan menambah jumlah rumah sakit dalam implementasi PPRA di Indonesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REGULASI</td>
<td>EDUKASI</td>
<td>MANAJERIAL</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>• Memasukkan parameter PPRA ke dalam penilaian Akreditasi Rumah Sakit</td>
<td>Koordinasi dengan KARS dan pemangku kepentingan terkait</td>
<td>Memfasilitasi kegiatan PPRA dalam akreditasi Rumah Sakit</td>
</tr>
</tbody>
</table>
Workshop PPRA Guidance
KemKes RI at Denpasar: 26-29 Oct 2011

Participants:
• RSUP H. Adam Malik Medan
• RSUP Cipto Mangunkusumo Jakarta
• RSUD. Moewardi Surakarta
• RSUP Hasan Sadikin Bandung
• RSUP Sanglah Denpasar

Fasilitator:
• RSUD Dr.Soetomo Surabaya
• RSUP Dr.Kariadi Semarang
Follow Up

• Each hospital will guide for expanding the implementation of ARCP in 4 hospitals around the region
• Conduct training on the implementation of the ARCP
• Providing guidance, monitoring and evaluation implementation of PPRA in the Hospital
• To report of ARCP implementation in National Workshop
Standarization training syllabus

• Global problem of antimicrobial resistance
• Antimicrobial resistance control strategy
  – Emphasis is selective pressure to the principle of wise use of antibiotics
  – Prevention of the spread of microbes resistant to the application of standard precaution
• Principles of Use of Antibiotics for Prophylaxis
• Principles for Therapeutic Use of Antibiotics
• Interpretation of the results of microbiological examination
• Preparing reports and patterns of microbial resistance patterns (WHO-net)
• Antibiotic Guidelines preparation
• Monitoring and control of Antibiotics in hospitals
• Standardization Implementation PPRA (Pilot Project)
• Audit Use of Antibiotics in Quantitative & Qualitative
• Skills TOT training materials:
• Implementation Guidance and Development
12 Steps to Prevent Antimicrobial Resistance: Hospitalized Adults

*Step 4: Access the experts*

Infectious Diseases Expert Resources

Infectious Diseases Specialists

Healthcare Epidemiologists

Clinical Pharmacists

Clinical Microbiologists

Surgical Infection Experts

Infection Control Professionals

Clinical Pharmacologists

Optimal Patient Care
Should this patient get appropriate treatment?
Q. What’s the most expensive antibiotic?

A. The one that doesn’t work!
The essence of wisdom is the ability to make the right decision on the basis of inadequate evidence.
Thank You