The use and management of antibiotics: some proposals for Vietnam

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Prof. Françoise Van Bambeke, PharmD, PhD *
Prof. P. De Mol, MD, PhD **

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** Service de microbiologie, Université de Liège, Liège

Presented at the Ministry of Health of the Socialist Republic of Vietnam
Hanoi, Vietnam – 31 October 2013

With the support of Wallonie-Bruxelles-International
Objectives

Objectives:

• Examine the necessity of developing a policy on rational use of antibiotics in Vietnam due to the resistance threats (in both hospitals and community).

• Sharing experiences learned from the results Belgium has gained in the past 10 years in promoting the rational use of antibiotics.

• Suggesting potentially useful approaches for Vietnam.
Programme

• Presentation #1: Resistance to antibiotics and risks for Vietnam
  Questions and Answers

• Presentation #2: Potential solutions... The Belgian experience
  Questions and Answers

• Presentation #3: Suggestions for Vietnam
  General discussion
Who is present (for Belgium)

Prof. Françoise VAN BAMBEKE, Pharm, PhD
*Université catholique de Louvain*
- Pharmacology & Pharmacotherapy
- Antibiotic research (activity and resistance)

Prof. Patrick DE MOL, MD, PhD
*Université de Liège*
- Microbiology & Infection Control
- Vice-president of the Belgian *Conseil Supérieur de la Santé*

Prof. Paul M. TULKENS, MD, PhD
*Université catholique de Louvain*
- Pharmacology & Clinical Pharmacy
- Member of the Belgian Antibiotic Policy Coordination Committee
Why have we come to Vietnam?

- Official program supported by "Wallonie-Bruxelles" to help implementing "Clinical Pharmacy" and "Optimized use of antibiotics" in Hanoi through the University of Pharmacy.

- Application made in 2009 by the Cellular and Molecular Group of the Louvain Drug Research Institute (UCL) and the University of Pharmacy (Hanoi) for execution in 2010-2013.

- Program successfully terminated (with a symposium held in Hanoi on 30 October 2013).

- New program started in 2013 for 3 additional years for strengthening the previous activities.

On 15 October 2013, visit of The Minister of Health (Dr Nguyen) in Brussels with brief presentation of our activities and the Belgian system of antibiotic policy.
Antibiotics: what do we do?

- Antibiotic toxicity
- Novel bacterial targets
- Cellular pharmacokinetics
- Cellular pharmacodynamics
- Resistance
- Clinical applications

Antibiotics: from molecules to man
Antibiotics: what do we do?

- Cellular pharmacokinetics
- Cellular pharmacodynamics
- Antibiotic toxicity
- Resistance
- Novel bacterial targets
- International activities and expertise
- Clinical applications

Type Three Secretion System (T3SS)-mediated internalisation and cytotoxicity of *Pseudomonas aeruginosa* by epithelial and phagocytic cells: do inflammasome make the difference?

A. Anantharajah1, E. Faure2,3, J.M. Buyck1, P.M. Tulkens1, M.P. Mingeot-Leclercq1, B. Guery2,3 and F. Van Bambeke4

1 Cellular and Molecular Pharmacology, Lille 2 University hospital, Lille, France. 2 Host-Pathogen Translational Research Group, Lille 2 University, Lille, France. 3 Lille 2 University, Lille, France.
Antibiotics: what do we do?

- Cellular pharmacokinetics
- Cellular pharmacodynamics
- Antibiotic toxicity
- Resistance
- Novel bacterial targets
- Clinical applications

International activities and expertise

ISAP

PK/PD of Anti-Infectives Study Group

ESCMID
Antibiotics: what do we do?

- Cellular pharmacokinetics
- Cellular pharmacodynamics
- Resistance
- Clinical applications

In vivo development of antimicrobial resistance in *Pseudomonas aeruginosa* strains isolated from the lower respiratory tract of Intensive Care Unit patients with nosocomial pneumonia and receiving antipseudomonal therapy

Mickaël Riou¹, Sylviane Carbonnelle¹,², Laëtitia Avrain¹,², Narcisa Mesaros¹,³, Jean-Paul Pirnay⁴, Florence Bilocq⁵, Daniel De Vos⁶,⁷, Anne Simon⁸, Denis Piérard⁹, Frédérique Jacobs⁹, Anne Dediste⁹, Paul M. Tulkens¹,², Françoise Van Bambeke¹, Youri Glupczynski¹
Antibiotics: what do we do?

- Cellular pharmacokinetics
- Cellular pharmacodynamics
- Antibiotic toxicity
- Resistance
- Clinical applications
- Novel bacteria
- International activities and expertise

**Research Note in Bacteriology**

Prevalence and spread of extended-spectrum β-lactamase-producing Enterobacteriaceae in Ngaoundere, Cameroon

C. Lonchel Magoué, P. Melin, J. Gangoué-Piéboji, M.-C. Okomo Assoumou, R. Boreux and P. De Mol

1) Laboratory of Medical Microbiology, University of Liège, Liege, Belgium,
2) Institute of Medical Research and Medicinal Plant Studies, CRPMT, Yaounde, Cameroon and 3) Department of Virology, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Yaounde, Cameroon
Programme

• Presentation #1: 
  Resistance to antibiotics and risks for Vietnam
  Questions and Answers

• Presentation #2: 
  Potential solutions...
  The Belgian experience
  Questions and Answers

• Presentation #3: 
  Suggestions for Vietnam
  General discussion
Are antibiotics following a path to madness?

discovery in soil bacteria and fungi

1928 - …
Are antibiotics following a path to madness?

and then we all saw the blooming tree of semi-synthetic and totally synthetic antibiotics

1950 – 1980 …
Are antibiotics following a path to madness?

and the US General Surgeon told us that the fight was over

1970 …
Are antibiotics following a path to madness?

But...

2012...
Resistance of *P. aeruginosa* in hospitals
(International data – EUCAST breakpoints)

A major problem in Vietnam …

Resistance to Antibiotics to 4 Common Gram-negative Bacteria

- % Resistance
- 4th gen. cephalosporin
- 3rd gen. cephalosporin
- Aminoglycoside
- Fluoroquinolones
- Carbapenem

- P. aeruginosa
- Acinetobacter
- Klebsiella
- E. coli

Global Antibiotic Resistance Partnership (GARP), 2010
The resistome …

The antibiotic resistome.
- all the genes and their products that contribute to antibiotic resistance.
- highly redundant and interlocked system
- clinical resistance under represents the resistance capacity of bacteria.
- existing biochemical mechanisms (protoresistome) serve as a deep reservoir of precursors that can be co-opted and evolved to

http://www.nap.edu/openbook.php?record_id=12925
“Father resistance genes”:
an original example with aminoglycosides

Proc. Nat. Acad. Sci. USA
Vol. 70, No. 8, pp. 2276–2280, August 1973

Aminoglycoside Antibiotic-Inactivating Enzymes in Actinomycetes Similar to Those Present in Clinical Isolates of Antibiotic-Resistant Bacteria
(streptomyces/origin of R-factors/gentamicin-acetate)

RAOUl BENVENISTE* AND JULIAN DAVIES†
Department of Biochemistry, College of Agricultural and Life Sciences, University of Wisconsin—Madison, Madison, Wis. 53706
Communicated by Henry Lardy, May 11, 1973

• Actinomycetes produce aminoglycosides
• In order not to be killed by their production, they produce enzymes that degrade aminoglycosides
• The genes coding for these enzymes have been passed to clinically important pathogens
The selectome

A simple application of Darwin’s principles ...

genes

enzymes / nucleoproteins

function

selection pressure

Detail of watercolor by George Richmond, 1840. Darwin Museum at Down House
How and why can you select so easily?

A simple application of Darwin’s principle…
to a highly plastic material…

• an infectious focus typically contains more than $10^6 - 10^9$ organisms

• most bacteria multiply VERY quickly (20 min…) and do mistake …

• they are not innocent or useless mistakes

- section pressure

- fast selection of the fittest!
There is a clear association of resistance and the global use of antibiotics in EU countries.

Logodds of resistance to penicillin among invasive isolates of Streptococcus pneumoniae regressed against outpatient sales of beta-lactam antibiotics in 11 European countries; (resistance data are from 1998 to 1999; antibiotic sales data 1997. DDD = defined daily dose)

There is also a fast emergence of resistance with the use of antibiotics at subtherapeutic doses.
Actually, selecting for resistance is easy even in a closed system…

Exposure of *E. aerogenes* to antii-Gram (-) β-lactams to 0.25 MIC for 14 days with daily readjustment of the concentration based on MIC determination

<table>
<thead>
<tr>
<th>strains</th>
<th>MIC (mg/L) a</th>
<th>TEM-exposed</th>
<th>Revertant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>TEM</td>
<td>FEP</td>
</tr>
<tr>
<td>2114/2 c</td>
<td></td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>2502/4 c</td>
<td></td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>3511/1 c</td>
<td></td>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>7102/10 d</td>
<td></td>
<td>512</td>
<td>32</td>
</tr>
</tbody>
</table>

a figures in bold indicate values > the R breakpoint for Enterobacteriaceae (EUCAST for MEM [8] and FEP [4]; BSAC and Belgium for TEM [16])
b dotblot applied with antiOmp36 antibody; signal quantified for grey value after subtraction of the signal of a porin-negative strain (ImageJ software); negative values indicate a signal lower than the background
c ESBL TEM 24 (+); d ESBL (-) and AmpC (+) [high level]; e Intermediate (I) according to EUCAST

Nguyen Thi Thu Hoai et al. (post-doc at LDRI) presented at the 8th ISAAR, Seoul, Korea, 8 April 2011 and additional work in progress
A simple but very illustrative experiment …

Exposure of *E. aerogenes* to anti-Gram (-) β-lactams to 0.25 MIC for 14 days with daily readjustment of the concentration based on MIC determination

<table>
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<th>Initial MIC (mg/L)</th>
<th>TEM-exposed MIC (mg/L)</th>
<th>Revertant MIC (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TEM</td>
<td>FEP</td>
<td>MEM</td>
</tr>
<tr>
<td>2114/2</td>
<td>8</td>
<td>2</td>
<td>0.25</td>
</tr>
<tr>
<td>2502/4</td>
<td>8</td>
<td>2</td>
<td>0.125</td>
</tr>
<tr>
<td>3511/1</td>
<td>32</td>
<td>2</td>
<td>0.125</td>
</tr>
<tr>
<td>7102/10</td>
<td>512</td>
<td>32</td>
<td>1</td>
</tr>
</tbody>
</table>

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By Nguyen Thi Thu Hoai et al. (post-doc at LDRi) presented at the 8th IN-AAR, Seoul, Korea, 8 April 2011 and additional work in progress

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Sub-MIC concentrations select for resistance!
What are the risks for Vietnam?

1. Resistance seems to reach an alarming level in hospitals
   - increased use of "last resort" antibiotics (toxic and of dubious activity) or "makeshift" associations;
   - clinical experience of lack of efficacy of initial treatments...

Because there is no or very little progress in the discovery of new antibiotics against Gram-negative bacteria, failures in hospitals due to these organisms are likely to markedly increase.
What are the risks for Vietnam?

2. Resistance has also reached the community and moves from community to hospitals

- patients enter hospitals with resistant strains;
- failures in the community requiring hospitalizations
- increased burden for hospitals

The global burden (hospital plus community) may become unbearable for the Health System leading to major human and economic losses!
A few examples of antimicrobial resistance in Vietnam
# Resistance to 11 antimicrobial drugs of $bla_{\text{NDM}-1}$–positive *Klebsiella pneumoniae* isolates from the Kim Nguu River, Hanoi, Vietnam

<table>
<thead>
<tr>
<th>Antimicrobial drug</th>
<th>MIC, mg/L</th>
<th>Site X</th>
<th>Site Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piperacillin/tazobactam</td>
<td>64–&gt;256</td>
<td>64–&gt;256</td>
<td></td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>&gt;256</td>
<td>&gt;256</td>
<td></td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>96–&gt;256</td>
<td>128–&gt;256</td>
<td></td>
</tr>
<tr>
<td>Meropenem</td>
<td>8–&gt;32</td>
<td>12–&gt;32</td>
<td></td>
</tr>
<tr>
<td>Imipenem</td>
<td>6–&gt;32</td>
<td>&gt;32</td>
<td></td>
</tr>
<tr>
<td>Fosfomycin</td>
<td>3–8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>&gt;1,024</td>
<td>&gt;1,024</td>
<td></td>
</tr>
<tr>
<td>Tobramycin</td>
<td>384–&gt;1,024</td>
<td>256–384</td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>0.064–1.5</td>
<td>0.064</td>
<td></td>
</tr>
<tr>
<td>Colistin</td>
<td>0.19–2</td>
<td>0.125–0.38</td>
<td></td>
</tr>
<tr>
<td>Tigecycline</td>
<td>1.5–3</td>
<td>0.5–1.5</td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Antibiotic(s) tested</th>
<th>Prevalence of resistance % (n, total n = 818)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TET</td>
<td>74 (609)</td>
</tr>
<tr>
<td>SXT</td>
<td>68 (559)</td>
</tr>
<tr>
<td>AMP</td>
<td>65 (533)</td>
</tr>
<tr>
<td>CHL</td>
<td>40 (325)</td>
</tr>
<tr>
<td>NAL</td>
<td>27 (220)</td>
</tr>
<tr>
<td>CIP</td>
<td>&lt; 1 (2)</td>
</tr>
<tr>
<td>TET + SXT + AMP</td>
<td>45 (368)</td>
</tr>
<tr>
<td>TET + SXT + AMP + CHL</td>
<td>25 (208)</td>
</tr>
<tr>
<td>TET + SXT + AMP + CHL + NAL</td>
<td>8 (68)</td>
</tr>
</tbody>
</table>

Abbreviations used: TET = tetracycline; SXT = co-trimoxazole; AMP = ampicillin; CHL = chloramphenicol; NAL = nalidixic acid; CIP = ciprofloxacin
## Prevalence of multiresistant Gram-negative organisms in a surgical hospital in HCMC, Vietnam

<table>
<thead>
<tr>
<th>Organism</th>
<th>Number</th>
<th>ESBL (n)</th>
<th>ESBL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Enterobacter</em> spp.</td>
<td>71</td>
<td>4</td>
<td>5.5</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>150</td>
<td>29</td>
<td>19.3</td>
</tr>
<tr>
<td><em>Salmonella</em> spp.</td>
<td>5</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>Klebsiella</em> spp.</td>
<td>12</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>Citrobacter</em> spp.</td>
<td>2</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>Proteus</em> spp.</td>
<td>22</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>Edwardsiella</em> spp.</td>
<td>10</td>
<td>7</td>
<td>70.0</td>
</tr>
<tr>
<td><em>Enterobacteriaceae</em></td>
<td>272</td>
<td>40</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Tropical Medicine & International Health. 11, 11, p 1725–30, 2006
What are the risks for Vietnam?

3. The system will NOT be self-healing because the current medico-economic system favors over-use (and mis-use) of antibiotics
What are the risks for Vietnam?

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What are the risks for Vietnam?

3. The system will NOT be self-healing because the current medico-economic system favors over-use (and mis-use) of antibiotics

There is a clear need to change the rules in Vietnam (as in many other countries)
High antibiotic consumption as a risk?

First report on antibiotic use and resistance in Vietnam hospitals
Conclusions (part #1)

• Resistance is a worldwide problem;

• Vietnam is not an exception, but levels of resistance seem to be very high;

• Resistance is, like in other countries, linked to overconsumption and/or wide distribution of antibiotics;

• In the absence of public coordinated action, no or little improvement is to be expected.

Time for questions and answers
Programme

• Presentation #1: Resistance to antibiotics and risks for Vietnam
  Questions and Answers

• Presentation #2: Potential solutions...
The Belgian experience
  Questions and Answers

• Presentation #3: Suggestions for Vietnam
  General discussion
Potential lines of action

ESSAY

Tackling antibiotic resistance


Nature Reviews Microbiology 9, 894-896 (December 2011)
7 pillars of wisdom?

1. Public education
2. Public health, sanitation and quality of life
3. New antibiotics $\rightarrow$ new / poorly exploited targets
4. Old antibiotics
5. Better antibiotic use
6. Alternatives to antibiotics
7. Collaborative approach and new Economics

Bush et al. Nature Reviews Microbiology 9, 894-896 (December 2011)
Public campaigns in Belgium

- Launched in 2000 (1st in Europe)
- Repeated (and evaluated) each year until now

RESEARCH LETTER

Association Between Antibiotic Sales and Public Campaigns for Their Appropriate Use

JAMA, November 24, 2004—Vol 292, No. 20 2469

Public campaigns and decrease of antibiotic consumption in the community

Residual seasonal autoregressive terms: lag period, 12 months; estimated coefficient: 0.83 [SE, 0.06]; constant: 7459075 (SD, 431387) defined daily doses/mo. The P values are indicated for the months and campaigns for which the changes were statistically significant.
Belgian Antibiotic Policy Coordination Committee

- Created by Royal Decree in 1999
- Multidisciplinary
- Scientific Experts and Representatives of the main Institutions
- With expertise in
  - microbiology,
  - resistance to antibiotics,
  - antibiotic management
  - assessment of antibiotic consumption
  - infection control and hygiene
Belgian Antibiotic Policy Coordination Committee

6 Working groups
- veterinary medicine
- public actions
- out-patients (community)
- hospital
- medical statistics
- Drug reimbursement committee

Scientific platforms
Structure of infection control in hospitals

BAPCOC

Federal platform

Regional platform
Regional platform
Regional platform
Regional platform
Regional platform
Regional platform

Infection control teams in acute hospitals

Referees in hospital infection control in wards
Non-antibiotic targeted prevention measures

- Developing nations
  - improving sanitation
  - cleaning up water supplies
  - relieving overcrowding
  - frequent hand washing

- Industrialized countries
  - frequent hand washing,
  - developing vaccines
  - Infection control programs in hospitals and in the community,

Global strategy for containment of antimicrobial resistance (WHO)
Trends of MRSA through Europe

Proportion of MRSA isolates in participating countries in 2008
(c) EARSS

EARSS: European Antimicrobial Resistance Surveillance System
Impact of Hand Hygiene on nosocomial infections

Hand hygiene compliance trend 1994-97

- **Disinfection**
- **Washing**


Impact of Hand Hygiene on nosocomial infections
Epidemiological surveys in Belgium

- **National Institute for Public Health**: activities based on
  - **Sentinel laboratories** (associated with large hospitals)
    - Collection of specific strains (non-suscept. *S. pneumoniae*, MRSA, Carbapenemase-producing *Enterobacteriaceae*, *Legionella*…)
  - **National reference Centers** associated with University Hospitals or with NIH
    - characterization of the strains, epidemiology
  - **Sentinel general practitioners**
    - determination of the ongoing clinical situation of epidemic diseases (acute respiratory diseases, diarrhea,…)
    - Collection and analysis of the data at the NIH level

Dixième surveillance de la résistance aux antibiotiques dans des souches non invasives de Streptococcus pneumoniae collectionnées en Belgique pendant l’hiver 2007 à 2008

R. Vanhoof a,*, K. Camps b, M. Carpentier c, S. De Craeye a, J. Frans d, Y. Glupczynski e, P. Goffinet f, B. Gordts g, D. Govaerts h, L. Ide i, P. Lefèvre j, M. Lontie k, R. Cartuyvels l, F. Meunier m, B. Mulondo n, I. Philippart o, I. Surmont p, E. Van Bossuyt q, J. Van Eldere r, J. Verhaegen s

a WIV/ISP, Unit of Antimicrobial Research, Institute of Public Health, 642, Biegelandstraat, 1180 Brussels, Belgium
b AZ Stuivenberg, 2060 Antwerpen, Belgium
c Hôpital de la Citadelle, 4000 Liège, Belgium
d Imelda ziekenhuis, 2820 Bonheiden, Belgium
e Clinique universitaire de Mont-Godinne, 5530 Yvoir, Belgium
f Cliniques du Sud-Luxembourg, 6700 Arlon, Belgium
g AZ St. Jan, 8000 Brugge, Belgium
h CHU André-Vésale, 6110 Montignies-le-Tilleul, Belgium
i AZ Isolde Poffijn, 5000 Gent, Belgium
j Hôpital Princesse-PAOLA, 6990 Marche-en-Famenne, Belgium
k Medisch Centrum Huisartsen, 3000 Leuven, Belgium
l Virga-jessereiissenhuis, 3500 Hasselt, Belgium
m Hôpital de Jolimont, 7100 Haine St Paul, Belgium
n Clinique Saint-Étienne, 1210 Brussels, Belgium
o Hôpital de Wurquiques, 7300 Boussu, Belgium
p H. Hartzienhuis, 8800 Roeselare, Belgium
q National Reference Centre Pneumococcus, UZ Gasthuisberg, 3000 Leuven, Belgium
Epidemiological survey of *S. pneumoniae*
Regional distribution by carbapenemase type:
1/1/2012 - 30/06/2013

Belgian surveillance data:
January 2012 - June 2013

OXA-48: 538 cases
Hospitals with OXA-48 clusters: 14

VIM-1: 31 cases
Hospitals with VIM-clusters: 1

KPC-2: 70 cases
Hospitals with KPC-clusters: 6

NDM: 13 cases
Hospitals with NDM-clusters: 1

All carbapenemase types: 656 cases
Hospitals with ≥ 1 cluster: 20 (22 clusters)

ICAAC 2013, B. Jans, D. T-D Huang, P. Bogaerts, B. Catry, Y. Glupczynski
Guidelines to improve antibiotic use

**Pratique ambulatoire**

*NOUVEAU*


[PDF] Intercalaire antibiotiques pour médecins généraliste - édition 2012

(rezumé du guide ci-dessus)

Recommandation - Prise en charge de la gastro-entérite aiguë en pratique ambulatoire
Setting-up guidelines to improve antibiotic use

- Definition of the objective of the guidelines
- Assembling a panel of independent experts
- Proposing guidelines based on EBM
- Disseminating the guidelines
- Audit of usefulness and compliance
- Regular update

Parameters to take into account for antibiotics:
- Local epidemiology
- Local resistance

Quality criteria according to the AGREE* instrument:
- Scope and purpose
- Stakeholder involvement
- Rigor of development
- Clarity of presentation
- Applicability
- Editorial independance

*Appraisal of Guidelines Research and Evaluation – developed through an EU-funded research project and available on http://www.agreetrust.org/
Guidelines in Vietnam: current issues

Based on reflections from GARP Phase 1 Vietnam

Nguyen Van Kinh, M.D, Ph.D
Chairman, GARP-Vietnam
Director of National Hospital for Tropical Diseases
On behalf of GARP-VN National Working Group

• Most treatment guidelines outdated
• Recommendations for antibiotics do not take into account current resistance profiles
• Guidelines use ‘Western’ data, not Asian
• Must take into account local epidemiology

→ improvement desirable
Antibiotic policy control group in Belgium

Multidisciplinary team ...

- Manager
- Infectious diseases MD
- Microbiologist
- Infection control specialist
- Clinical pharmacist trained in ID
- Pharmacist
- MD from departments using antibiotics
- Informatician
Position within the hospital organigram

Medical direction

- medical-pharmaceutical comittee
  - Therapeutic formularium

Antibiotic policy group

Delegate to antibiotic policy

- wards
  - Antibiotic treatment

committee for hygiene

- Prevention of infections
- Epidemiology of resistance
- Follow-up of infections

- 1 to 4 people depending on the size of the hospital
- background:
  - internist - pneumologist,
  - microbiologist
  - hospital pharmacist
  - hygienist
- 2 years specific training
Priority tasks

• **Mandatory interventions**
  – Hospital formularium

• **Required interventions**
  – Guidelines
  – Local epidemiology

• **Priority interventions**
  – Evaluation of consumption
  – Link between consumption and epidemiology
  – Providing advice about antibiotic use
  – Limitation and control of antibiotic usage
  – Staff education
  – Annual report for the commission coordinating antibiotic policy
One example of intervention of the antibiotic policy group in Belgium

St Luc hospital, Université catholique de Louvain

University hospital, ~ 950 beds

22 pharmacists
Among them, 6 full-time in clinical pharmacy
One example of the situation in St-Luc Hospital before implementation of Antibiotic Management

Follow-up of the use of broad spectrum antibiotics

<table>
<thead>
<tr>
<th>Results</th>
<th>Meropenem</th>
<th>Pip-tazo</th>
<th>Ceftriaxone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically justified Prescriptions</td>
<td>84 %</td>
<td>83%</td>
<td>86%</td>
</tr>
<tr>
<td>Bacteriologically justified prescriptions</td>
<td>56 %</td>
<td>28 %</td>
<td>17%</td>
</tr>
<tr>
<td>Clin. and bacteriol. justified prescriptions</td>
<td>52 %</td>
<td>26 %</td>
<td>17 %</td>
</tr>
<tr>
<td>Treatment duration appropriate</td>
<td>84.5 %</td>
<td>90 %</td>
<td>76%</td>
</tr>
<tr>
<td>% correct posologies</td>
<td>86 %</td>
<td>76 %</td>
<td>95 %</td>
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Conclusions part #2

- The Belgian experience shows that useful programs can be initiated on a coordinated fashion nationwide;
- This involves the Ministry of Health which acts through specialized national programmes and agencies, universities, hospitals, and general practitioners;
- 4 actions are essential: Antibiotic Management (hospital), Guidelines, Epidemiology, Infection Control
- BAPCOC (Belgian Antibiotic Policy Coordination Committee) is the keystone of most of these activities, with epidemiological studies coordinated by the National Institute of Health.

Time for questions and answers
Programme

• Presentation #1: Resistance to antibiotics and risks for Vietnam
  Questions and Answers

• Presentation #2: Potential solutions...
The Belgian experience
  Questions and Answers

• Presentation #3: Suggestions for Vietnam
  General discussion
1. Epidemiological surveys

- Collection of representative strains in key centers (sentinels) carefully selected across the country (both community and hospitals):
- Centralized analysis of the data in specific centers (including quality control of the sampling);
- Accurate identification (environment vs. true human pathogens);
- MICs distributions to be preferred to Susceptible/Resistant only;
- Periodic reports including statistical analysis to be communicated to Ministry of Health and to practitioners with recommendations for improvement;
- Data to be used for elaborating or updating therapeutic guidelines, defining essential antibiotics, and rationalizing antibiotic policies.
2. Promoting a better use of antibiotics in the Community

- Training of Pharmacists (both after graduation and during their studies)
- Training of the Assistant Pharmacists
- Promotion of Family Doctors
- Addressing the issues of delivery without prescription
- Increase the awareness of the public about risks of inappropriate use
- Effective control of promotion by Industry Representatives
3. Antibiotic Management groups in hospitals

- Improving co-working between all currently involved healthcare practitioners
- Make the microbiologist more involved in the decision and the follow-up process of infectious diseases management
- Adding and developing clinical pharmacy (both centralized and in the ward)
- Follow-up of local situations in each hospital and rapid reaction in case of infectious problem (Infection Control Team)

4. “VAPCOC”

- Promote at the level of the Ministry of Health a National Coordination Center susceptible to centralize the various activities and programmes already initiated about antibiotic resistance by different stakeholders (Vietnamese Antibiotic Policy Coordination Committee [VAPCOC]);

- Have VAPCOC
  - create new initiatives as fitted to the Vietnamese situation (such as Clinical Pharmacists, Hospital Antibiotic Management Team, ...) and to liaise with the newly formed Vienamese Drug Center;
  - stimulate coordinated epidemiological surveillance systems that meet the requirements of Vietnam (e.g., specific alert systems, quality control, specific infections,...);
  - defining the priorities for action and the proposed strategies.
5. Change of economical model (1)

- In the current economic framework, Pharmaceutical Industry is looking for mass sales as this is how they win money;
- the situation is exacerbated by the emergence of generics where lower prices can only be compensated by larger sales (hospital and community)

This creates a situation intrinsically in contradiction with a prudent use of antibiotics (limited sales for serious indications and restricted use of most potent antibiotics)
5. Change of economical model (2)

- Alternative models can and must be developed

- One potential model is where Government and Industry make an agreement on
  - volume of sales (DDDs, or other)
  - prices
  in a tender system where the winner also takes responsibility for promoting the appropriate use of antibiotics

The goal is to dissociate volume of sales and incomes and to discourage excessive sales
Time for questions and answers