WHO WORLD ANTIBIOTIC AWARENESS WEEK
14-20 NOVEMBER 2016

HANDLE ANTIBIOTICS WITH CARE

Program for the Specialist of
Healthcare-Associated Infection Control and Prevention
Knowledge Co-Creation Session

16 NOVEMBER 2016

Sharing Experiences of Antimicrobial Resistance (AMR)

National Center for Global Health and Medicine, Japan
Bureau of International Health Cooperation

Japan International Cooperation Agency

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Preface

Health problems of great concern in the world today would include cancer, cerebrovascular disease, and pneumonia. The issue of Antimicrobial Resistance (AMR) is currently considered to be a small problem compared with these major health concerns. However, it is estimated that the number of people who die because of AMR will exceed the number of deaths from cancer within the next few decades if we ignore the problem. AMR is an issue that requires urgent action.

Moreover, it is not necessarily the developed countries that will see many people lose their lives to AMR. Rather, it is predicted that the problem will be more serious in emerging and developing countries. In these countries, standards of medical and health care are gradually improving as their economies develop. However, AMR could place a substantial clinical burden on medical facilities. The problem will become a major obstacle to medical treatment in each country and hinder the development of medical facilities unless we address the problem now.

AMR is a global issue. In order to tackle it, each country needs to gather together and share their knowledge and experience to find a resolution. However, each country's efforts are not always presented as papers or covered by the media. Therefore, it is extremely difficult for us to obtain information on the efforts each country is making. Fortunately, however, we were able to have an opportunity to discuss measures against AMR with people from the countries that participated in JICA's training course. We learned about the current AMR situation as well as the initiatives in each country. This document is a report describing the information we shared at the workshop. The report will give you a clear understanding of how serious AMR is in the context of each country, and how these countries are studying and trying to deal with the problem. In this sense, this report is an important document that is of academic value. I hope that the workshop where participants of the training course shared their knowledge and experience has served as the first step toward developing effective measures to combat AMR in each country.

Norio Omagari
Director, Disease Control and Prevention Center,
National Center for Global Health and Medicine

Executive Summary

Health care-associated infections (HCAI) and related deaths, together with increased costs due to extended hospitalization and medical treatment, have become serious problems both in developed and developing countries.

In particular, antimicrobial resistance is one of the biggest threats to global health and food security. Antimicrobial resistance is rising to dangerously high levels in all parts of the world. We have to tackle this problem with not only health professionals but also policy makers, the healthcare industry and the agriculture sector.

Japan International Cooperation Agency (JICA) and National Center for Global Health and Medicine (NCGM) have conducted a Program for the Specialist of Healthcare-Associated Infection Control and Prevention since 2003 for the hospital administrators and the persons in charge of HCAI control in their respective institutions, as well as trainers for their staff regarding HCAI control.

Participants shall have opportunities in Japan to understand the principles and practices of HCAI control through a series of lectures, workshops and site visits, and moreover to formulate an action plan to solve the problems related to HCAI control in their respective countries and hospitals.

Leveraging the opportunity of the program and WHO World Antibiotic Awareness Week 2016, JICA and NCGM organized Knowledge Co-creation Session "Sharing Experiences of Antimicrobial Resistance."

As speakers, representatives from JICA, Ministry of Health, Labour and Welfare, Government of Japan and participants of the abovementioned program from four countries (China, Vietnam, India and Egypt) made presentations on the Experiences of Antimicrobial Resistance.

Lastly, we appreciate all participants and persons involved for their effort and collaboration for this successful session and we hope that the session will nurture mutual collaboration among participating countries and Japan by sharing knowledge and experiences in HCAI control now and in the future.

Opening

Coodinator

Jun Moriyama

Bureau of International Health Cooperation,
National Center for Global Health and Medicine

Moderator

Norio Omagari

Director, Disease Control and Prevention Center,
National Center for Global Health and Medicine

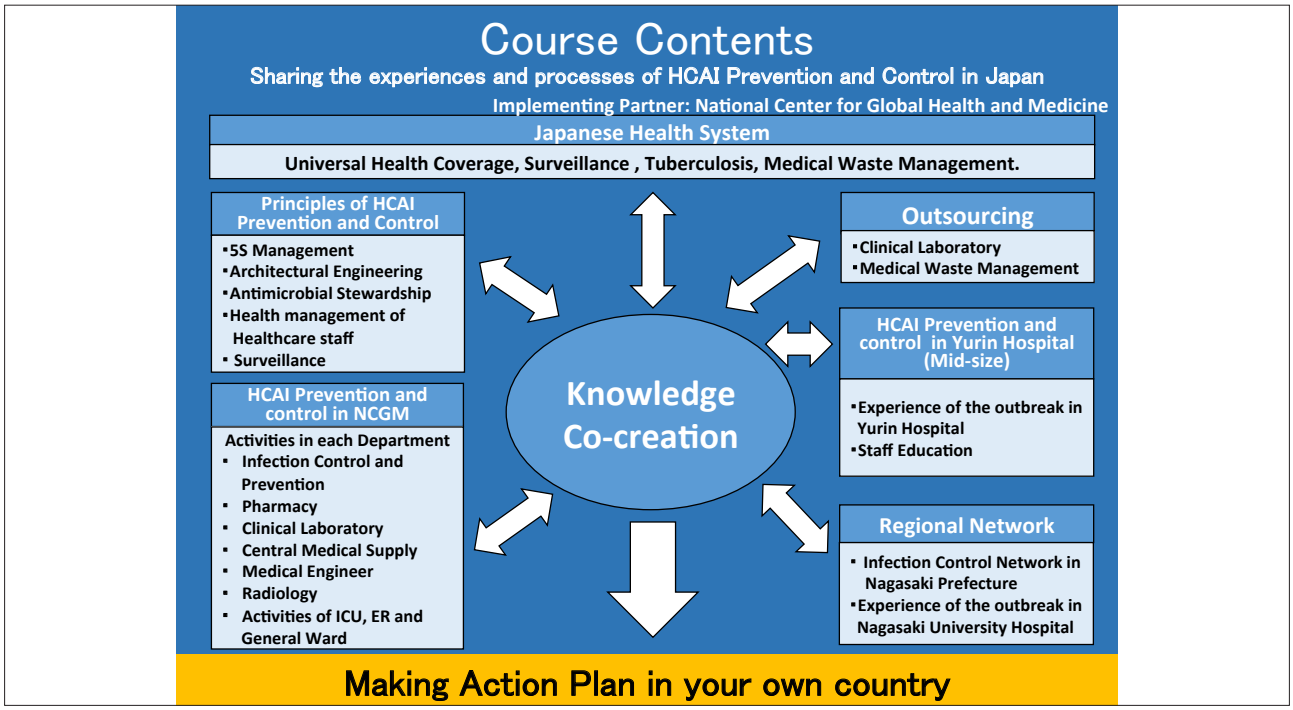
Jun Moriyama: Ladies and gentlemen, now we would like to start the Knowledge Co-Creation Program and sharing experiences of antibiotic resistance. I would like to welcome you all and thank you all for your presence. I am Jun Moriyama from the Bureau of International Health Corporation. First, let me introduce you all to the program. This session on antimicrobial resistance (AMR) is one of the Japan International Cooperation Agency (JICA) programs for the specialists in healthcare associated infection control and prevention. This is the concept of our program.

This program aims to make action plan for implementing more effective policies for infection control and prevention in their own facilities.

In particular, antibiotic resistance is one of the biggest threats to global health. It can affect anyone, of any age, and in any country. Tackling the antibiotic resistance is high priority for us. We have planned this session today as it is the World Antibiotic Awareness Week.

Participants from China, Egypt, India, and Vietnam will talk about their country's current situation and challenges against AMR. The speaker from Japan is in charge of AMR measures in the Ministry of Health and JICA. Thereafter, we would like to discuss about AMR measures.

Now, I would like to introduce Dr. Omagari, Director, Disease Control and Prevention Center, National Center for Global Health and Medicine. Today, he is the chairman of the session.



I

National Action Plan on Antimicrobial Resistance in Japan

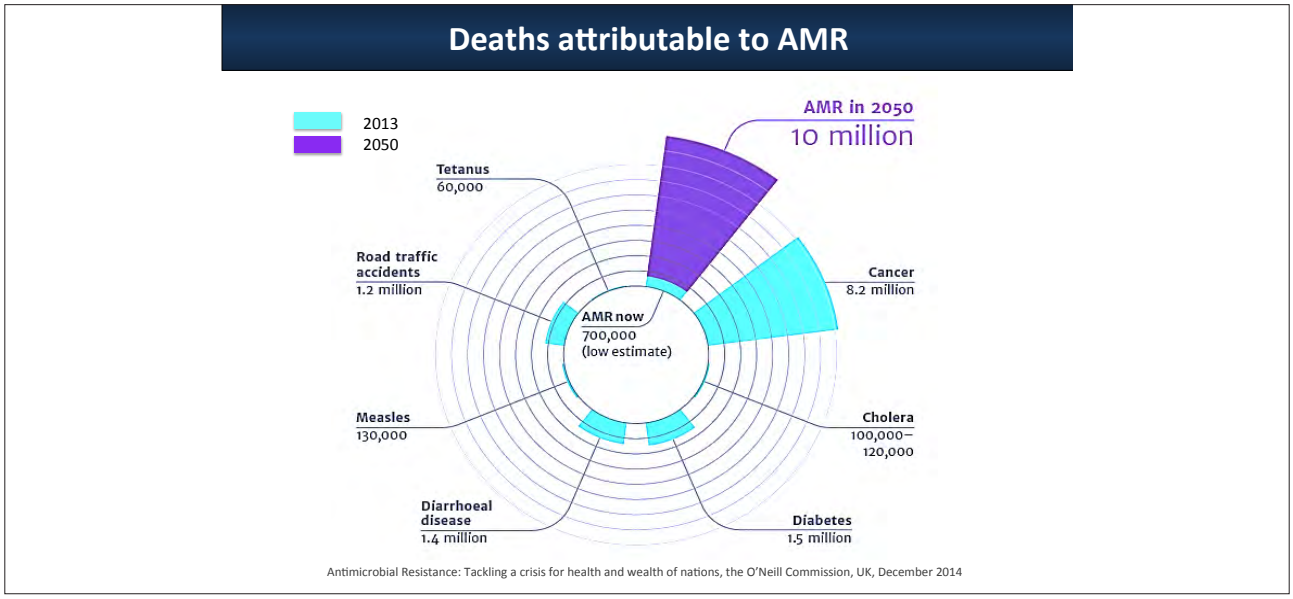
Kazuhiro Kamata M.D

Tuberculosis and Infectious Diseases Control Division, Health Service Bureau, Ministry of Health, Labour and Welfare, Government of Japan

Dr. Omagari: Thank you very much. Today, we have six speakers and we have about 20 minutes for their presentation.

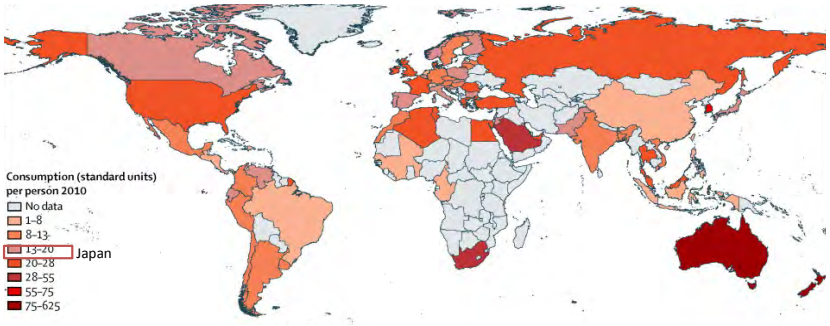
I would like to introduce our first speaker, and our first speaker is Dr. Kamata from Japan. He is actually from the tuberculosis and infectious disease control division, Ministry of Health, Labor and Welfare. So Dr. Kamata please get to the podium and start your presentation.

Dr. Kamata: Thank you, Chairperson Dr. Omagari. I am from the Ministry of Health, Labor and Welfare, Government of Japan. Great honor to have this opportunity to present Japanese challenges to combat AMR. Today, I would like to talk mainly regarding two points: first, the current status of antibiotic use and second, National Action Plan in Japan, which was launched in April this year. In last May, Japan was host to G7 Summit in Ise-Shima. For almost five years, AMR has been discussed in the international meetings such as World Health Organization and G7 Summit; in May 2015, the World Health Assembly endorsed the Global Action Plan on AMR and asked all member states to develop a relevant national action plan within two years. But what is the problem and what happened due to AMR?



This is one report to answer this question. The UK has estimated that deaths due to AMR reached 10 million worldwide by 2015, and gross domestic product of $1,000 trillion will be lost if no measure will be taken in the future, so AMR is a threat to global health security.

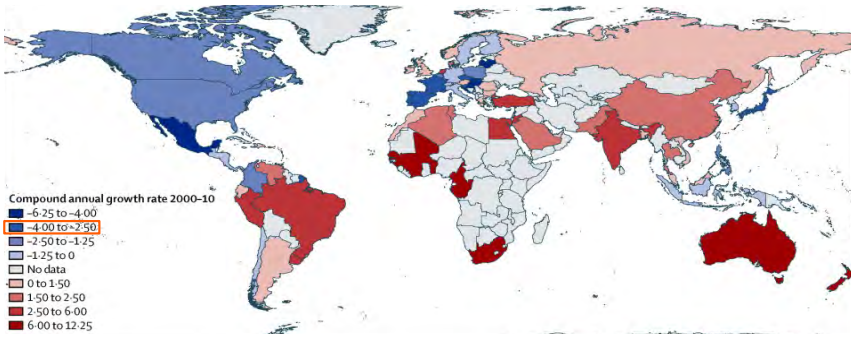
Human Antibiotic Use per Person (2010)



Reference: Van Boeckel TP et al., *Lancet Infect Dis.* 2014; 14: 742-50.

Next, I talk about consumption. This slide shows the total consumption of antibiotics in 2010. The more color dark red, the more antibiotics are consumed. According to this research, Japan is placed in the middle or lower in the world.

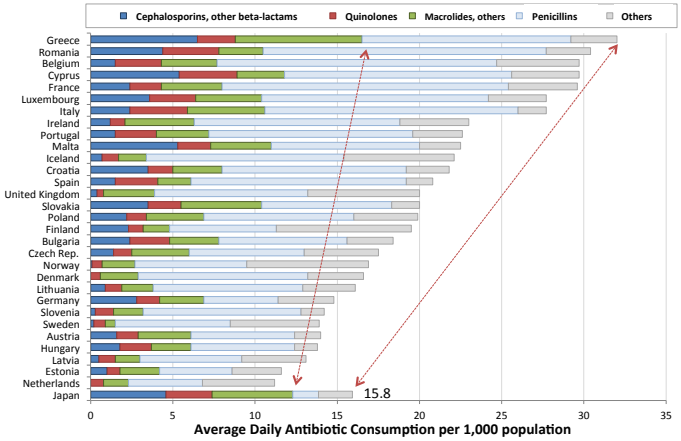
Antibiotic Use Growth Rate from 2000 to 2010



Reference: Van Boeckel TP et al., *Lancet Infect Dis.* 2014; 14: 742-50.

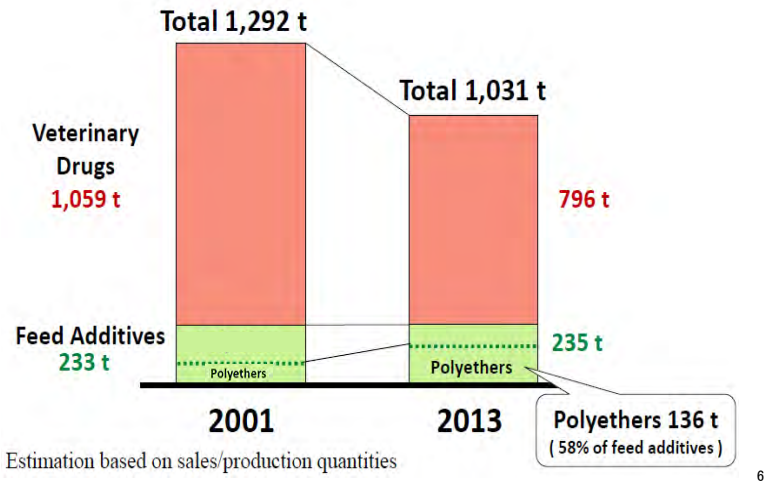
This is a trend indicating growth rate of antibiotic usage from 2000 to 2010. Blue-colored countries have lower growth rate, and Japan's place in these blue-colored countries means decrease in growth rate of antibiotic usage from 2.5% to 4% in 10 years. Furthermore, this provides the details of antibiotic consumption in Japan compared with in European countries.

Comparison of Antibiotic Use (2012)



Japan is shown at the bottom, with 15.8 (Defined daily doses/1,000 inhabitants/day). Once again, we can find that the total usage of antibiotics in Japan is lower. However, as you can see, Japan has certain characteristics. The proportion is different. Light blue area means that the usage of penicillin in Japan is smaller compared with other countries, and the usage of oral antibiotics such as cephalosporin, which is blue and colored red and green, is frequent in Japan. These trends are risky situation to produce newly resistant bacteria as well as for livestock.

Antibiotic Use for Livestock in Japan



It shows the total amount of antimicrobial used for livestock in Japan. It is decreasing in these 10 years because the Minister of Agriculture implemented a new guideline for the prudent use of antibiotics for veterinarians and farmers. Moreover, they establish risk assessment for these chemicals for human health in collaboration with the Ministry of Health and food safety committee.

6 Areas and Goals of AMR National Action Plan

Fields		Goals
1	Public Awareness and Education	Improve Public Awareness and Understanding, and Promote Education and Training of Professionals
2	Surveillance and Monitoring	Continuously Monitor Antimicrobial Resistance and Use of Antimicrobials, and Appropriately Understand the Signs of Change and Spread of Antimicrobial Resistance
3	Infection Prevention and Control	Prevent the Spread of Antimicrobial-resistant Organisms by Implementing Appropriate Infection Prevention and Control
4	Appropriate Use of Antimicrobials	Promote Appropriate Use of Antimicrobials in the Fields of Healthcare, Livestock Production and Aquaculture
5	Research and Development	Promote Research on Antimicrobial Resistance and Foster Research and Development to Secure the Means to Prevent, Diagnose and Treat the Antimicrobial-resistant Infections
6	International Cooperation	Enhance Global Multidisciplinary Countermeasures against Antimicrobial Resistance

Given these findings, the National Action Plan on AMR was developed by a ministerial meeting to promote countermeasures against AMR in Japan. Our National Action Plan has a structure that aims at six areas as you can see on this slide. First is public awareness and education, second is surveillance monitoring, third is infection prevention and control, fourth is the appropriate use of antimicrobials, and fifth is research and development. These fields, one to five are basically the same as in the WHO Global Action Plan in 2015; however, the last one, field six, international cooperation is original in the Japan action plan to fulfil Japan responsibility for international cooperation.

Outcome Indices for The Action Plan

Propotion of resistant isolates of specific indicator microorganisms			
	Indicator	**2014**	**2020 (Target)**
Humans	Penicillin-resistance in *Streptocuccus penumoniae*	48%	15% or Less
	Fluoroquinolone resistance in *Echerichia coli*	45%	25% or Less
	Methicillin resistance in *Staphylococcus aureus*	51%	20% or Less
	carbapenem resistance in *Pseudomonas aeruginosa*	17%	10% or Less
	Carbapenem resistant in *Escherichia coli/Klebsiella pneumoniae*	0.1-0.2%	0.2% or Less (same level as of 2014)
Animals	Tetracycline resistance in *Escherichia coli*	45%	33% or Less
	Third generation cephalosporin resistance in *Escherichia coli*	5%	same level as G7
	fluoroquinolone resistance in *Escherichia coli*	5%	same level as G7

Antimicrobial Use for humans (average amount of antimicrobials used per day per 1,000 population)		
Indicator	**2014**	**2020(Target)**
Total	15.8	Decreased by 33%
Oral Cephalosporins, Fluoroquinolones, Macrolides	11.6	Decreased by 50%
Amount of intravenous antimicrobials used	1.2	Decreased by 20%

In the National Action Plan, we set a numeral target in both fields of human and animals. We know it is quite challenging, but we need to clearly express the commitment to combat AMR. After the National Action Plan was developed, we have taken some action as you can see on this slide.

Actions taken

- November as Japan Antibiotic Awareness month – National Council on Countermeasures against AMR on November 1
- Committee set up for AMR in MHLW
- Multi-sectorial committee being set up for One-Health surveillance
  with Ministry of the Environment
  Ministry of Agriculture, Forestry and Fisheries
- Guideline being developed for antimicrobial stewardship

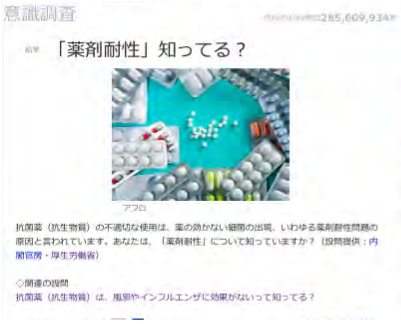
The World Antibiotic Awareness Week is held in this week. In the last few slides, I will talk about the current state of public awareness.

Antibiotics are not effective against cold and flu ?

This is Yahoo! Japan awareness survey that shows antibiotics are effective or not effective against cold and flu. Do you know this result or can

you imagine? Just over half of respondents gave the correct answer that antibiotics are not effective in these cases.

Do you know AMR ?



There is another question in the same Yahoo! Japan awareness survey, “Do you know what is AMR?” Accordingly, 60% responded that they don’t know or they know only the term AMR.

This is the current situation in Japan. AMR is a transboundary and cross-country global health

issue. Japan supports global countermeasures adapted by WHO both at high level and root levels and takes action to support the implementation of the Global Action Plan on AMR.

This is the end of my presentation. Thank you for your kind attention.

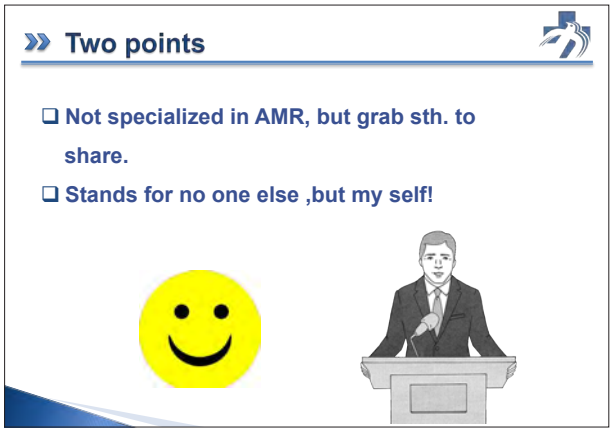
II

The Actions of China in Containing Antimicrobial Resistance

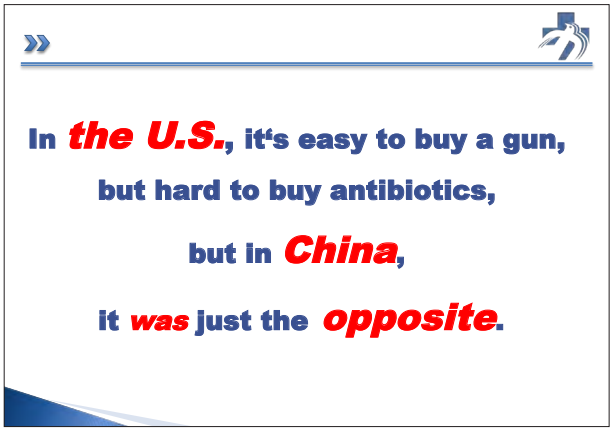
Weiguo Zhu M.D.,CPHIMS

Vice Senior, Division of General Internal Medicine /
Deputy Director, Department of Information Management General Internal Medicine,
Peking Union Medical College Hospital

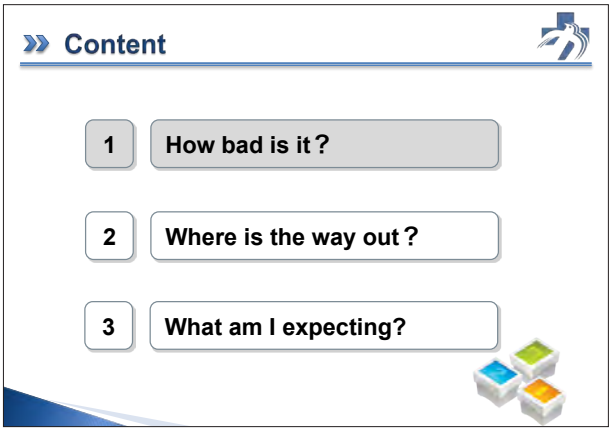
Dr. Omagari: Now I would like to introduce our second speaker, second speaker is Dr. Zhu. He is from China and he is a Vice Senior Division of General Internal Medicine and also Deputy Director Department of Information Management, Peking Union Medical College Hospital.



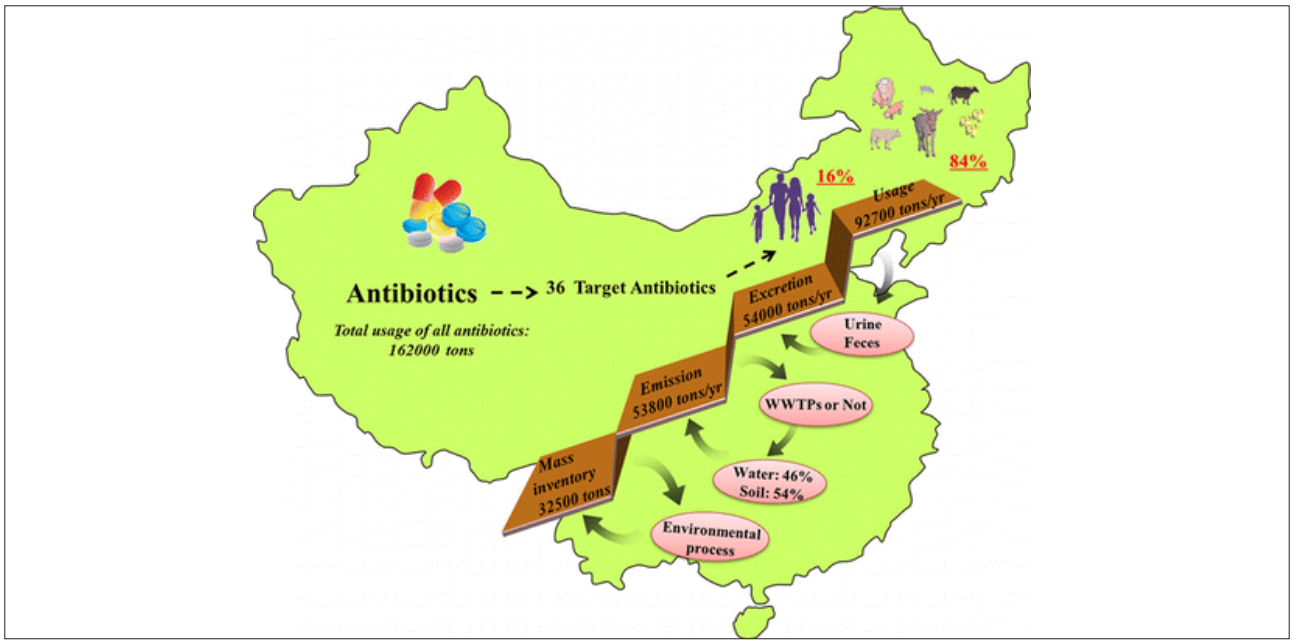
Dr. Zhu(China): Good afternoon and thank you JICA. It is my honor to be here giving a talk, and this is my title. I wish to clarify two points that I am not specialized in AMR, but I actually got something to share with you guys. Second one is because I do not ask for commission from hospital, so here I will stand for nobody else but for myself.



There is one saying in the U.S.—it is easy to buy a gun but difficult to buy antibiotics; in China, it is just the opposite.

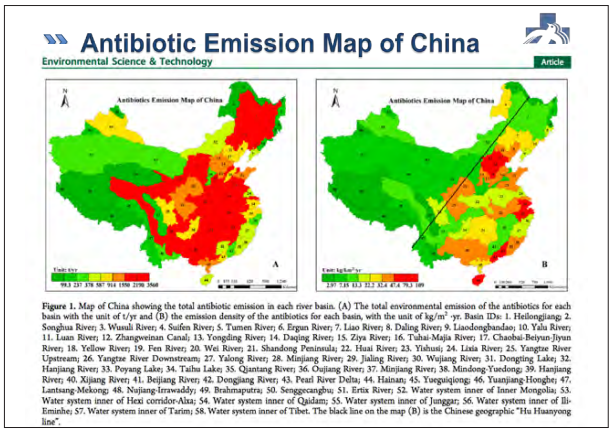


I will have three topics today, how bad is it and then where is the way out, what I am expecting.



How bad is it?

First, I would like to show our respect to this young man; because of him, we know the exact amount of antibiotics used in China through the work they published in this article in the environmental science and technology.



The map indicates that every year, the total usage of antibiotics is 162,000 tons per year. This is a map of the pollution around the river of China, and here is the – the left side is the total amount, and the right side is per square meter or per kilometer, it is the average amount.

Top 5 in China

- ❑Amoxicillin
- ❑Florfenicol
- ❑Lincomycin
- ❑Penicillin
- ❑Norfloxacin

Peking Union Medical College Hospital

Five antibiotics are commonly used in China according to his research.

NO Comparison no harm

Table 2. Total Usages of All Antibiotics in China and Other Developed Countries

		usage (tons)				
country	year	total	human	animals	DID[a]	ref
China	2013	162000	77760	84240	157	this study
UK	2013	1060	641	420	27.4	56, 57
USA	2011/2012	17900	3290	14600	28.8	58, 59
Canada	2011	*b*	251	*b*	20.4	60
Europe	2003	*b*	3440	*b*	20.1	32

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Amount per 1000 people.day

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Diverse and abundant antibiotic resistance genes in Chinese swine farms

Yong-Guan Zhu[a,b,1,2], Timothy A. Johnson[c,d,1], Jian-Qiang Su[a], Min Qiao[b], Guang-Xia Guo[b], Robert D. Stedtfeld[c,e], Syed A. Hashsham[c,d], and James M. Tiedje[c,d,2]

[a]Key Lab of Urban Environment and Health, Institute of Urban Environment, Chinese Academy of Sciences, Xiamen 361021, China; [b]Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China; and [c]Center for Microbial Ecology, Departments of [d]Plant, Soil and Microbial Sciences, and [e]Civil and Environmental Engineering, Michigan State University, East Lansing, MI 48824

Contributed by James M. Tiedje, December 31, 2012 (sent for review October 31, 2012)

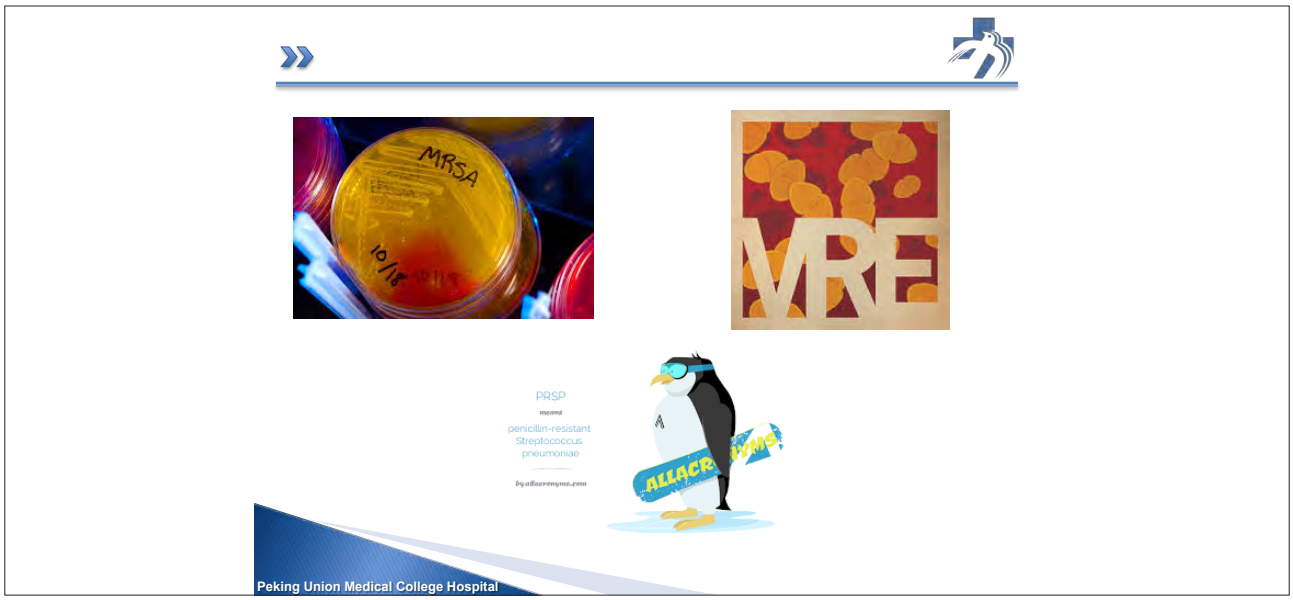
Antibiotic resistance genes (ARGs) are emerging contaminants posing a potential worldwide human health risk. Intensive animal husbandry is believed to be a major contributor to the increased environmental burden of ARGs. Despite the volume of antibiotics used in China, little information is available regarding the corresponding ARGs associated with animal farms. We assessed the types and concentrations of ARGs at three stages of manure processing to land disposal at three large-scale (10,000 animals per year) commercial swine farms in China. In-feed or therapeutic antibiotics used on these farms include all major classes of antibiotics except glycopeptides. High-capacity quantitative PCR arrays detected 149 unique resistance genes among all of the farm samples, the top 63 ARGs being enriched 192-fold (median) up to 28,000-fold (maximum) compared with their respective antibiotic-free manure or soil controls. Antibiotics and heavy metals used as feed supplements were

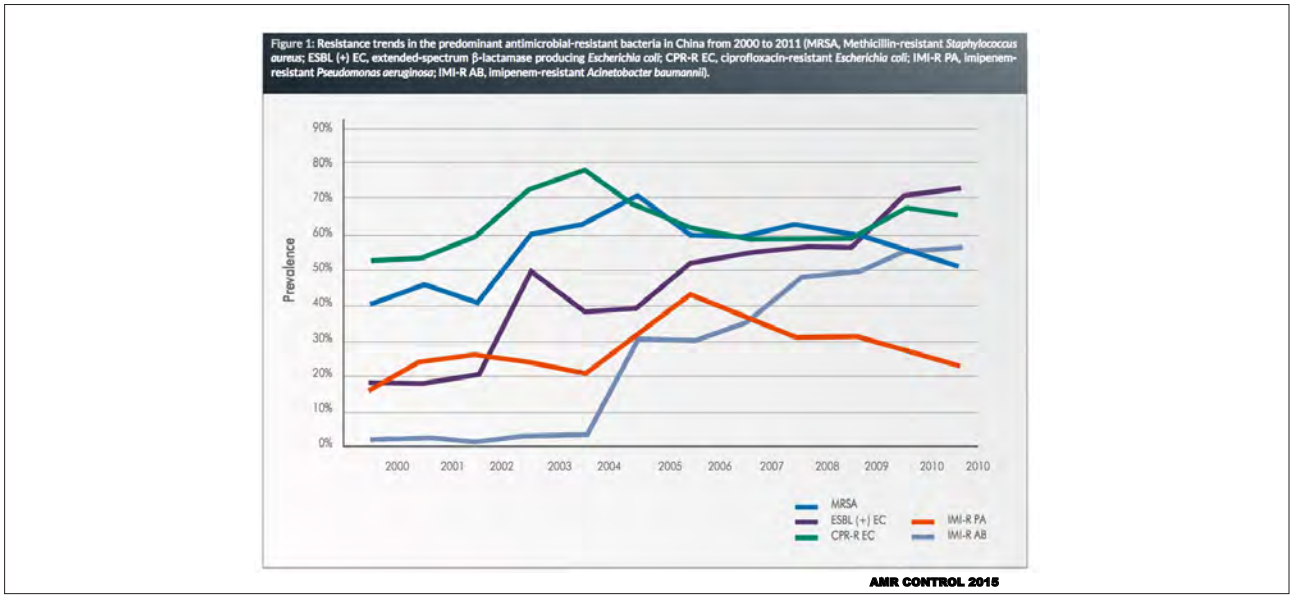
Health, together with the US Food and Drug Administration and the World Health Organization, urge improved regulation of veterinary antibiotic use in over 100 developing countries (12).

China is the largest antibiotics producer and consumer in the world. A 2007 survey, the estimated annual antibiotics production in China was 210 million kg, and 46.1% were used in animal husbandry industries (13), at least four times the amount used in the U.S. livestock industry in 1999 (14). In China, the use of antibiotics such as for animal disease treatment and growth promotion is unmonitored, which often leads to high use, reflected by the high concentrations of antibiotic residues (hundreds of milligrams of tetracycline per kilogram) that are commonly detected in animal manures (15, 16). Manure is a major source of antibiotic pollution in the environment, and China produces an estimated 618 billion kg of swine manure annually (17). Most

149

There is one saying, “no comparison, no harm.” We can see that in China, UK, and USA, the number of antibiotics used is about six times compared with that in other countries such as U.S. and Canada, about 149 unique gene mutations are caused by resistance to antibiotics.





AMR situation in China

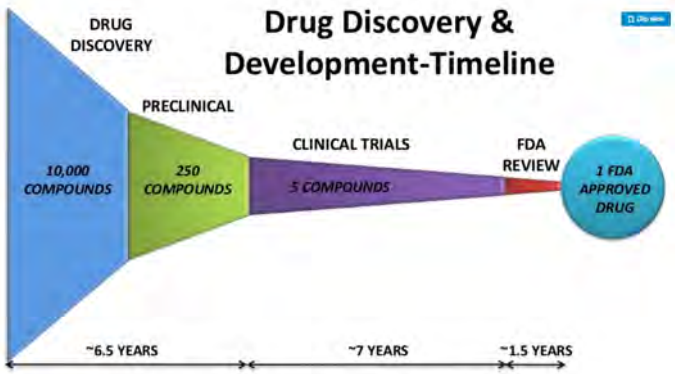
- The prevalence of MRSA in tertiary hospitals is approximately 50%
- More than 80% of *S. aureus, Streptococcus pneumoniae,* and *Streptococcus pyogenes* were resistant to macrolides and clindamycin
- Among Gram-negative bacteria, approximately 70% of *Escherichia coli* isolates were resistant to ciprofloxacin and approximately 60% were resistant to third-generation cephalosporins.
- Carbapenem-resistance was seen in 20%– 35% of *P. aeruginosa* and in more than 50% of Acinetobacter baumannii.

Peking Union Medical College Hospital

AMR CONTROL 2015

Some one says

It doesn't matter, because pharmaceutical companies will develop more new antibiotics.



We have MRSA and other issues, VRE or VRSP. Someone says that it doesn't matter because pharmaceutical companies will develop more new antibiotics, but that is not true.

For pharmaceutical companies at the very beginning, actually if we have 10,000 compound, then to the next pre-clinical period it will be 250 components, and then when we move to clinical trials, only five compound can be chosen and then finally only one, it takes about seven or eight years to get one new kind of compound.

The worst thing is that no more new kinds of antibiotics have been developed

SINCE 1987

The worst thing is that no more new kinds of antibiotics have been developed since 1987, which is another threat.

Campaign

In 2011, the Chinese government began a three-year special campaign for rational antibiotic use centered on the

"Administrative Regulations for the Clinical Use of Antibiotics".

Peking Union Medical College Hospital

Regulations

关于抗菌药物临床应用管理有关问题的通知
2009年3月23日（卫办医政发〔2009〕38号）

关于印发《全国抗菌药物联合整治工作方案》的通知
2010年12月15日（卫办医政发〔2010〕111号）

卫生部办公厅关于做好全国抗菌药物临床应用专项整治活动的通知
2011年4月18日（卫办医政发〔2011〕56号

卫生部办公厅关于继续深入开展全国抗菌药物临床应用专项整治活动的通知
2012年3月5日（卫办医政发〔2012〕32号）

抗菌药物临床应用管理办法
2012年4月24日（卫生部令第84号）

关于进一步开展全国抗菌药物临床应用专项整治活动的通知
2013年5月6日（卫办医政发〔2013〕37号）

国家卫生计生委办公厅关于做好2014年抗菌药物临床应用管理工作的通知
国卫办医函〔2014〕300号

国家卫生计生委办公厅、国家中医药管理局办公室关于进一步加强抗菌药物临床应用管理工作的通知
国卫办医发〔2015〕42号

What is the way out?

Where is the way out? Like countries such as Japan and other countries, the Chinese government just began a three-year special campaign for national antibiotic use centered on the Ministry of Regulations for this clinical use of antibiotics in 2011. These are all the regulations, actually it is not from 2011, but starting from – actually there was a SARS breakout at that time, after that actually, so these are all those regulations.

Regulation Outlines

1. 组织机构和职责
2. 抗菌药物临床应用管理
3. 监督管理
4. 法律责任

Peking Union Medical College Hospital

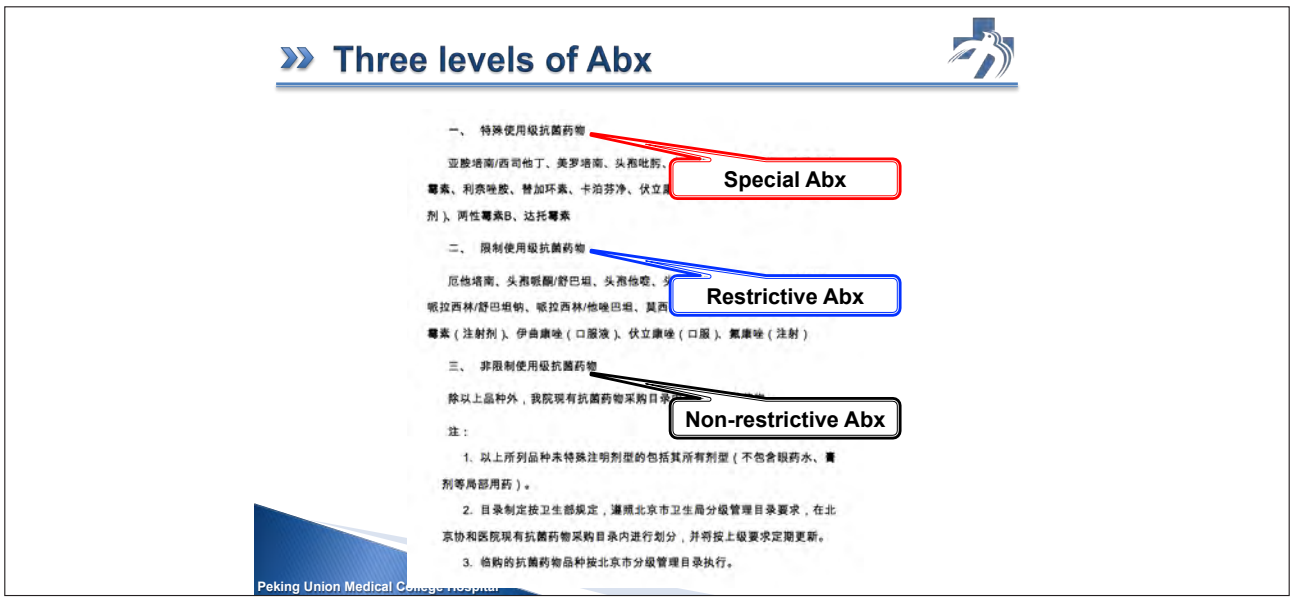
Regulation Outlines

1. The roles, responsibilities and liabilities of health administrative authorities, medical institutions, hospital task forces and all categories of health-care professionals in detail.
2. Stewardship: to build professional teams, implement staff training, and establish and improve the technological systems supporting rational antibiotics use.
3. Indicators & Surveillance
4. Legal responsibilities

Peking Union Medical College Hospital

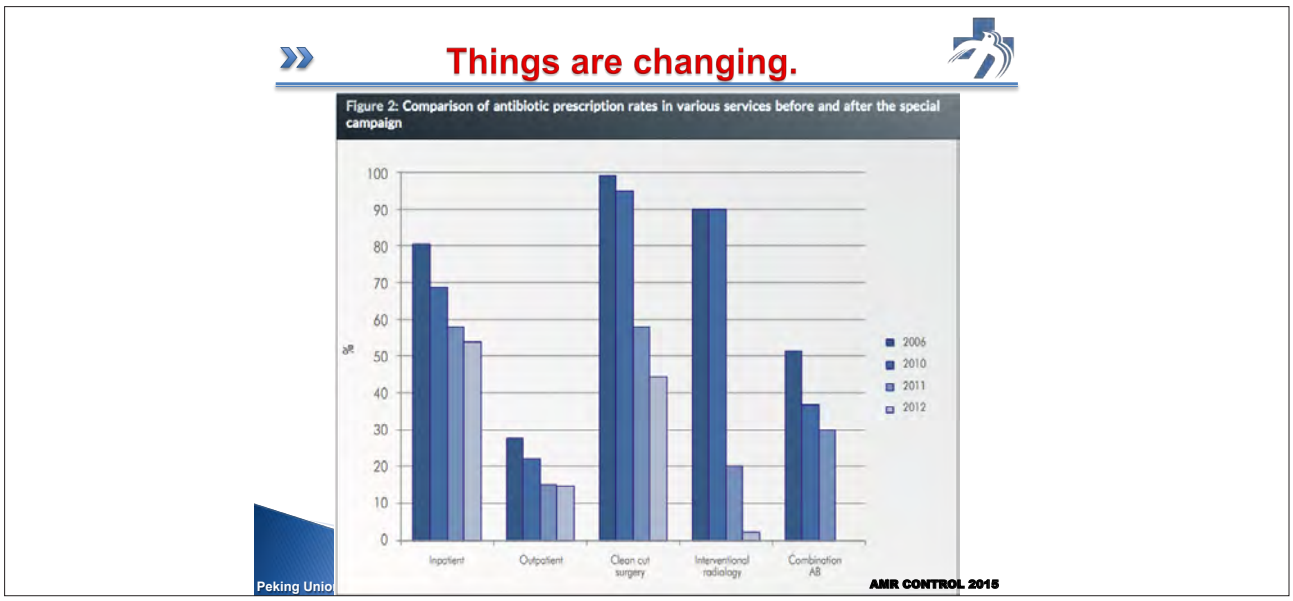
These are those outlines, translating to English would be easier here, so those roles, responsibilities, liabilities, and some facilities, and the third one is indicators and surveillance, and four is legal responsibilities.

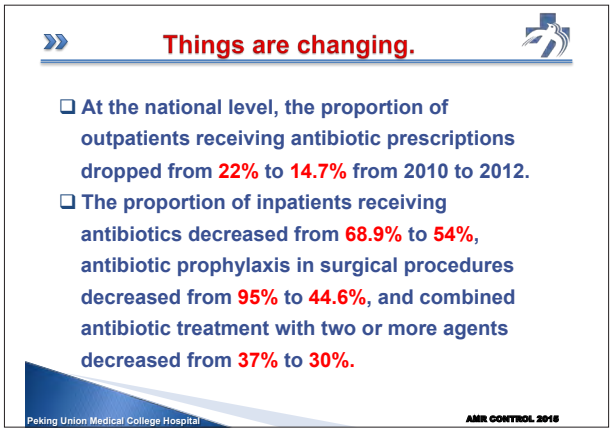
Here are some examples, these are the guidelines from the government regarding the antibiotics usage, which is published, and we take that for example.



We classify antibiotics into three kinds of levels, and here nonrestrictive antibiotics. These kinds of antibiotics can be prescribed by resident or by attending every physician in the hospital, and the second one will be the restrictive antibiotics that can only be prescribed by attending – and those who get the right after the examination of antibiotic use test. The top one, the last one is special antibiotics, for example, independent. Such kinds of antibiotics cannot be used freely and randomly. They should be applied by clinicians and then there would be ID, infectious disease team on call to review those physician orders and then give the permission to use that.

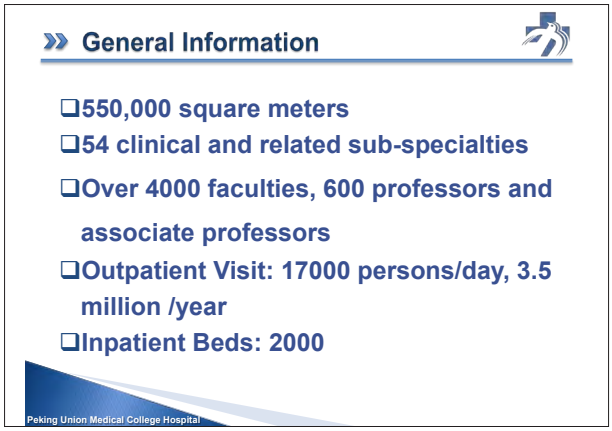
The advanced surveillance is one thing, but the inspection is another important issue. The government will send a team on inspection, we call that fly check. This is an example of our hospital. Actually we met with those teams nine times the whole year. It comes from different labels, some from the government, some from local government, some from MoH and surveillance.



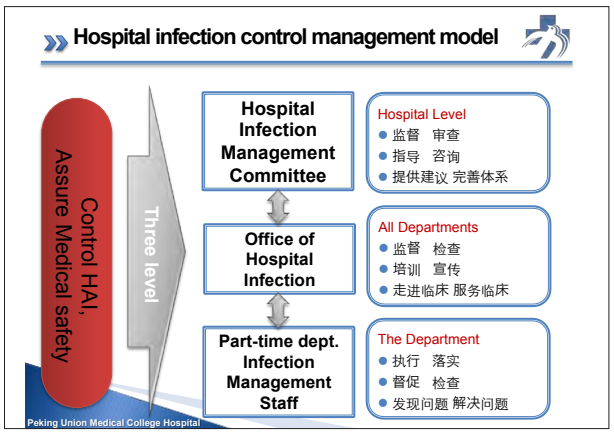


Actually things are changing for the better. This is 2006 and then 2010, 2011, 2012, and an inpatient or outpatient pays that prescription, the amount of that, and then it is decreased a lot. These are our exact numbers, for example, the prescription of the outpatients regarding those using antibiotics dropped from 22% to 14.7% up to two years of the program and other numbers.

Regarding our hospital, this hospital was founded in 1921 by Rockefeller as a teaching hospital of Peking Union Medical College. This is our new building actually, and it ranks number one among the best hospitals in China for continuously about seven years.

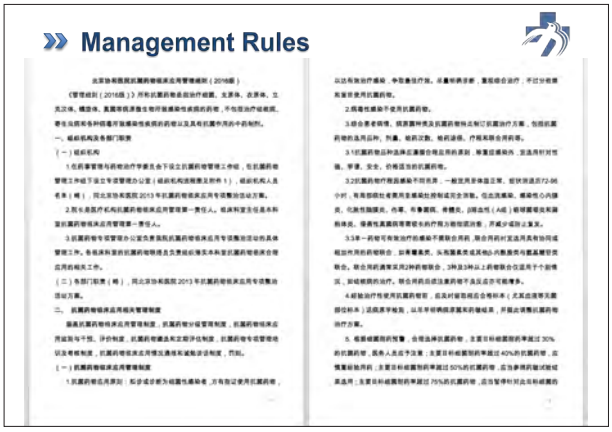


This is a general information. We have 54 clinical departments and over 4,000 faculties and 17,000 visits per day.



In our hospital, usually, we will have the framework of the management infrastructure.

This is the Infection Control Committee, this is the hospital level, and then the office. I am glad that I am one of the members in the group, and other members come from the office of medical affairs, from the pharmaceutical department, from nursing, from the labs, and from the IT department; I am from general internal medicine and also IT department.



These are our rules about environment use, and here is about the hand washing.

This is the self-reporting result of hand washing rate, and here is the supervising or just checking of those result, and there is a gap you see that.

Here you see 98%, but this is 85%, there is a gap between self-reporting and supervising.

Another thing we do is prescription review for antibiotic prescription. I mean the hospital will usually once a month or once a week will review those antibiotic prescriptions to reveal what is the optimal usage and what is not optimal. This is a system to support that.

Things are changing too.

主要控制指标（2013年全部达标）	住院患者抗菌药物使用率%	门诊患者抗菌药物处方比例%	I类切口手术预防使用抗菌药物比例%	抗菌药物使用强度
要求控制指标	≤60%	≤20%	≤30%	≤40
2011年6月	55.84%	8.60%	62.23%	37.68
2012年6月	44.44%	5.65%	41.51%	41.65
2013年6月	36.20%	2.79%	21.48%	33.48
2014年6月	37.30%	2.80%	24.30%	38.10
2015年6月	35.55%	2.58%	23.02%	36.70

2010年 5月我院医院感染现患率为6.67%（抗菌药物专项整治活动前）
2012年12月我院医院感染现患率为6.66%
2013年12月我院医院感染现患率为6.33%（抗菌药物专项整治活动后）
2014年 5月我院医院感染现患率为5.66%
2015年 5月我院医院感染现患率为5.16%
整体处于平稳水平，符合国家<10%的要求。

2015年管理目标：
保持达标 避免反弹
内涵管理 规范合理

Peking Union Medical College Hospital

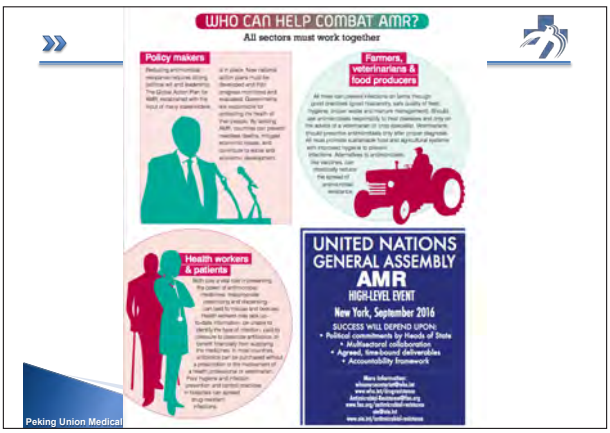
Things are changing too-MDR

- MDR Measures：
  - Isolation CPOE
  - Isolation post/tag
  - Ward or Bed
  - Hand sanitizer beside the bed
  - Reserved thermometer, stethoscope, sphygmomanometer
  - Ward Round or Procedure at last

- 2015 is stepping down, even comparing to 2014
- Mostly ESBL(+) E Coli., MRSCoN、PDR-ABA

Peking Union Medical College Hospital

Things are changing. This is the year, for example, here is the inpatient antibiotic user rate, the percentage just dropped down from 55% to 35.5%, and it has dropped for MTR too, and these are the measures we took.

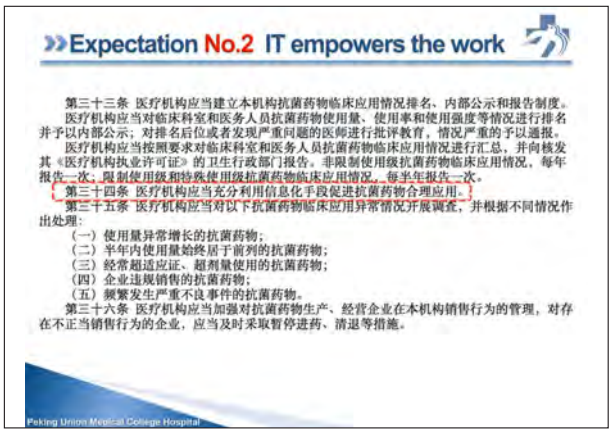


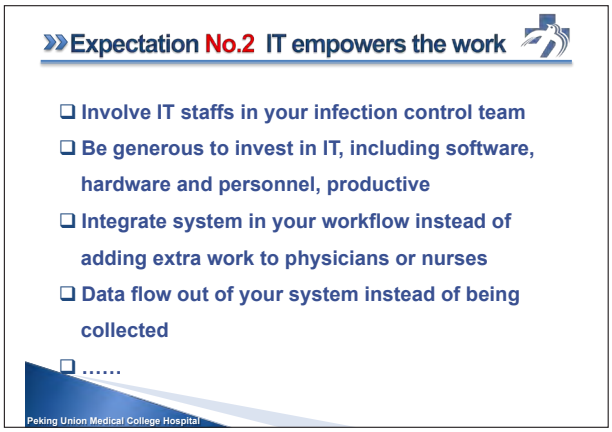
What am I expecting?

What I am expecting and also challenging is my own opinion just like advocate, AMR cannot be done only by healthcare workers like us, it should be in cooperation from various fields such as policymakers, farmers, vegetarians, patients, and here I would like to say cooperation is number one expectation.

Even though in hospital, we will cooperate as a team against this AMR, and then second one will be in the hospital and the pharmaceutical company because they want to sell more medications antibiotics, that is in conflict actually.

And then the third one healthcare providers to humans and animals, though there are not so much research just we talk about that, but in China, for example, quinolones are antibiotics that are used very often, too often in animals, so the soil, the earth is contaminated, and next one domestic and international cooperation will be there.





And number two, IT, I hope that IT can empower the work we are doing. In China, actually there is one item in the policy. The hospital should use IT to improve the optimal use as written in here. From my own experience, I would like to give some suggestions. First, involve IT staff in your infection control team if possible, and second, be generous to investing in IT, including software, hardware, and personnel. Sometimes it will be more productive than adding ___.

Expectation No.3 Green on the whole map

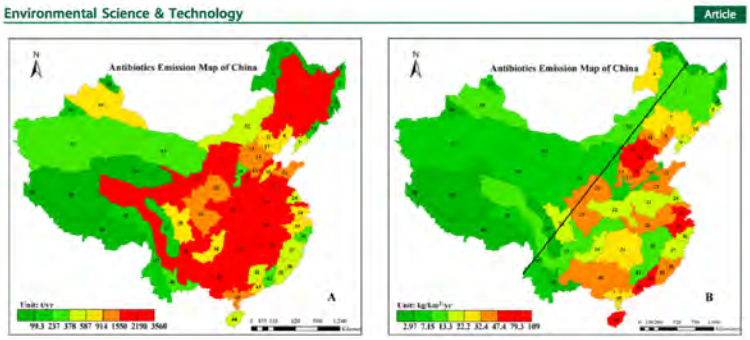


Figure 1. Map of China showing the total antibiotic emission in each river basin. (A) The total environmental emission of the antibiotics for each basin with the unit of t/yr and (B) the emission density of the antibiotics for each basin, with the unit of kg/m^2 ·yr. Basin IDs: 1. Heilongjiang; 2. Songhua River; 3. Wusuli River; 4. Suifen River; 5. Tumen River; 6. Ergun River; 7. Liao River; 8. Daling River; 9. Liaodongbandao; 10. Yalu River; 11. Luan River; 12. Zhangweinan Canal; 13. Yongding River; 14. Daqing River; 15. Ziya River; 16. Tuhai-Majia River; 17. Chaobai-Beiyun-Jiyun River; 18. Yellow River; 19. Fen River; 20. Wei River; 21. Shandong Peninsula; 22. Huai River; 23. Yishusi; 24. Lixia River; 25. Yangtze River Upstream; 26. Yangtze River Downstream; 27. Yalong River; 28. Minjiang River; 29. Jialing River; 30. Wujiang River; 31. Dongting Lake; 32. Hanjiang River; 33. Poyang Lake; 34. Taihu Lake; 35. Qiantang River; 36. Oujiang River; 37. Minjiang River; 38. Mindong-Yuedong; 39. Hanjiang River; 40. Xijiang River; 41. Beijiang River; 42. Dongjiang River; 43. Pearl River Delta; 44. Hainan; 45. Yueguiqiong; 46. Yuanjiang-Honghe; 47. Lantsang-Mekong; 48. Nujiang-Irrawaddy; 49. Brahmaputra; 50. Senggecangbu; 51. Ertix River; 52. Water system inner of Inner Mongolia; 53. Water system inner of Hexi corridor-Alxa; 54. Water system inner of Qaidam; 55. Water system inner of Junggar; 56. Water system inner of Ili-Eminhe; 57. Water system inner of Tarim; 58. Water system inner of Tibet. The black line on the map (B) is the Chinese geographic "Hu Huanyong line".

Third, integrate system in your workflow instead of adding extra work to physicians or nurses. For example, we just write down for the first time and then ask them to input that to the system the second time, that is not what we want to do. Fourth is data because these days I am hearing too many types of data are connecting, but my opinion is a little bit different, data should flow out of your system instead of being connected. It takes time. Third, I hope the map to become whole green in the map. Thank you.

Dr. Omagari: Thank you very much. Any comments or questions?

JICA: How do you see the progress of your innovative to control the use of the antimicrobials in your hospital?

Dr. Zhu (China): Thank you for your question. Actually, it is a comment actually I think – teamwork is very important, including not only physicians, nurses, and office but also other kinds of pharmaceutical members and labs and lab technicians, and also the awareness, I do not talk about that because Monday I talked about how training and awareness of such kind of a serious problem is very important. You cannot solve a problem without seeing it first, so that is very important, and the second one is the system.

Actually, because I am not a specialized AMR doctor, and before I came here, I just went to the office to see the person in charge, and I asked questions about what are those three strong points we do in our hospital. Her answer just shocked me. She said IT. IT not only connects data but helps physicians, nurses, and other staffs to do their work, not only the efficient but also the feedback is a surveillance and that is my own feeling about the opinion. Thank you.

Dr. Nahid (Bangladesh): I am Dr. Nahid from Bangladesh. I will question not only you but all of you from other countries expect Bangladesh. In your country, is it possible to buy an antibiotic without prescription as in our country?

Dr. Zhu (China): Maybe I can clear first and then the rest. Maybe you noticed that I used the word "was" in the second slide. Remember that "was" in China is the same thing actually and not your situation, but after we realized that problem with the government just – there is a ban to say that no antibiotic can be bought from the drug store without a prescription. Nowadays, it is very restrictive. I think that policymakers can do that.

Male Speaker 1: Any rule from physician – any rule to combat this problem, is there any rule?

Dr. Zhu (China): Yes, you cannot buy that actually, except the over the counters.

Male Speaker 2: How can I motivate the people? They can buy if they think that they are suffering from fever.

Male Speaker 3: I think it is a national counter measure to do that actually. In China or in any other country, I think that there should be a policy to guarantee that if the store or the physician just gives the antibiotics, not optimal, so they will be punished by the government or by some officials.

Ms. Pem Zam (Bhutan): I want to share the drug experiences. We are very new – it is a very new subject, AMR, and then this has been some other problem in the department of medical services, but as our friend from Bangladesh said, like especially in Bhutan it is very unique because we do not have private practices, and we have a handful of pharmacy shops, but then since we have a very strong regulatory office called drug and regulation, they have a mandate and none of these private pharmacies are allowed to sell antibiotic, except few multivitamins or maybe some painkillers but not the antibiotic at all. Thank you.

Dr. Sivaraman (India): My name is Dr. Sivaraman. I am from India. I have a comment to make. As she said, legislation is going to bring down this Over the counters and we can have legislation to stop selling antibiotics without a prescription, but it is very difficult to monitor this in a huge country like India, which has a huge population and many medical shops; it is not humanly possible for the controlling authority to monitor this. One thing is public awareness.

You can increase awareness among people of all this communication and through gadgets, you can spread this awareness that antibiotic is not a panacea for disease. Antibiotic is not an equivalent treatment for fever, the thing is to increase awareness among population that antibiotic is not for everything. Second thing is no amount of legislation or punishment is going to change people. The thing is you have to change the attitude of the people by giving

more information about why it should not be used, what are the effects on future generation; these are the important points in reducing AMR, and it is not going to happen overnight. It needs sustained effort from all the stakeholders, from the government, medical personnel, pharmacy, and all the people involved in combating AMR, then only we can see a visible change in few years or down the line, so this is the most important point as Dr. Nahid has indicated. Unless they change and unless people's attitude change, you cannot make a change in the Over the counters preparation or Over the counters selling of antibiotics. Thank you.

III

AMR Situation in Vietnam

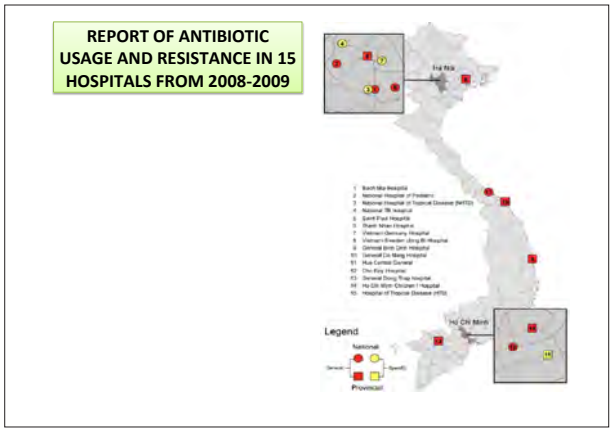
Dr. Truong Thien Phu

Head of Microbiology Department, Cho Ray Hospital

Dr. Nguyen Phuc Tien

The Department of Microbiology of Cho Ray Hospital

Dr. Omagari: I would like to invite our third speaker. He is from Vietnam; Dr. Phu, and he is the head of the Department of Microbiology of Cho Ray Hospital in Vietnam, it belongs to the Ministry of Health of Vietnam.



Dr. Phu (Viet Nam): Thank you very much Dr. Omagari. I will just share some experiences about the situation of AMR in Vietnam.

First, I want to introduce the study of Ministry of Health in 2008 to 2009 because I don't have the new data, only 2008, 2009, because they have support from Sweden; until now they don't have the funds to do, they collect the data from 15 hospitals from the north to the south of Vietnam, eight hospitals in the north, three hospitals in the middle, and four hospitals in the south. My hospital is Cho Ray hospital.

BACTERIA FROM 15 HOSPITALS 2009

Samples:
-Blood
-Spinal fluid
-Sputum
-Pus
-Urine

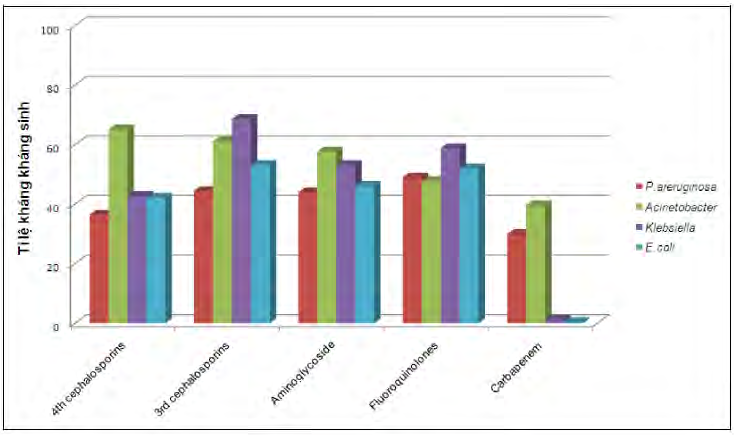
Vi khuẩn	BM	NHTD	NHP	TB	VD	SP	TN	UB	BD	DN	Hue	HTD	ND I	CR	DT
Acinetobacter	701	250	393	82	40	40	25	73	281	123	149	66	806	964	157
Burkholderia cepacia	56	2	185	219		6			1		26	91	18		1
Escherichia coli	970	156	402	51		155	32	322	560	468	304	70	722	1493	531
Haemophilus influenzae	26		92					392							
Klebsiella sp.	770	242	587	310	134	68	19	56	95	438	184	44	724	1129	496
Moraxella catarrhalis		3	23			1		784	20		20				
Neisseria gonorrhoeae			2					19							
Neisseria meningitidis			1			1									
Pseudomonas aeruginosa	635	98	382	204	192	107	26	98	310	254	190	19	234	818	183
Salmonella typhi		11						2				10			
Shigella flexneri						153		5							
Staphylococcus aureus	313	85	246		11	141	35	305	113		276	51	319	1353	313
Streptococcus pneumoniae	23	18	113			20		524	1		14	18	58		12
Streptococcus suis	48	38									23	23			
Vibrio cholerae	35		217			236		1							
Gram (-) khác	25	315	311	4	92	175	10	246	808	284	363	1	228		244
Gram (+) khác		23	10		19			128	508		415	52	930		40

BACTERIA FROM 15 HOSPITALS IN 2009

Vi khuẩn	Miền bắc		Miền trung		Miền nam	
	Số chủng	%	Số chủng	%	Số chủng	%
Klebsiella sp.	2097	16.3	717	11.7	2393	19.6
Escherichia coli	2051	16.0	1332	21.7	2816	23.0
Pseudomonas aeruginosa	1607	12.5	654	10.7	1254	10.3
Acinetobacter	1486	11.6	553	9.0	1993	16.3
Staphylococcus aureus	1111	8.7	389	6.3	2036	16.7
Moraxella catarrhalis	811	6.3	40	0.7	0	0.0
Streptococcus pneumoniae	687	5.4	15	0.2	88	0.7
Haemophilus influenzae	495	3.9	0	0.0	0	0.0
Vibrio cholearea	489	3.8	0	0.0	0	0.0
Burkholderia cepacia	412	3.2	27	0.4	110	0.9
Shigella flexneri	158	1.2	0	0.0	0	0.0
Streptococcus suis	40	0.3	23	0.4	23	0.2
Neisseria gonorrhoeae	21	0.2	0	0.0	0	0.0
Salmonella typhi	13	0.1	0	0.0	10	0.1
Neisseria meningitidis	2	0.0	0	0.0	0	0.0
Gram (-) khác	1178	9.2	1455	23.7	473	3.9
Gram (+) khác	170	1.3	923	15.1	1022	8.4
Tổng	**12828**	**100**	**6128**	**100**	**12218**	**100**

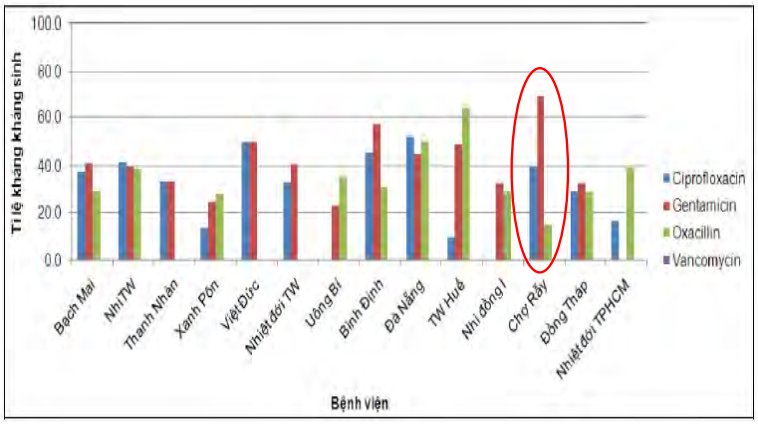
This is the data of the bacteria from 15 hospitals and sample from blood, spinal fluid, sputum post, and five most common bacteria are Acinetobacter, E. coli, and Klebsiella, Pseudomonas, and Staphylococcus aureus.

ANTIBIOTIC RESISTANCE OF COMMON BACTERIA

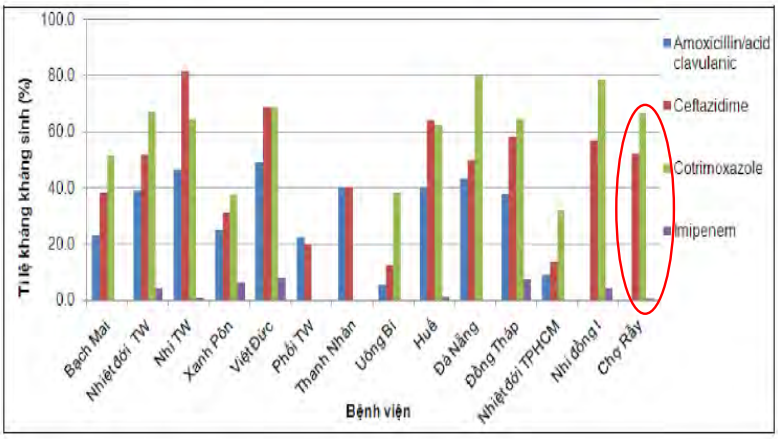


We conducted survey in the north, in the middle, and in the south of Vietnam, about many bacteria, and about the antimicrobial system, red is Pseudomonas, and green Acinetobacter, purple is Klebsiella, and blue is E. coli, and this is cephalosporin and this is third generation cephalosporin, this is a Aminoglycoside and fluoroquinolones and you see almost they resist over 30% just carbapenem

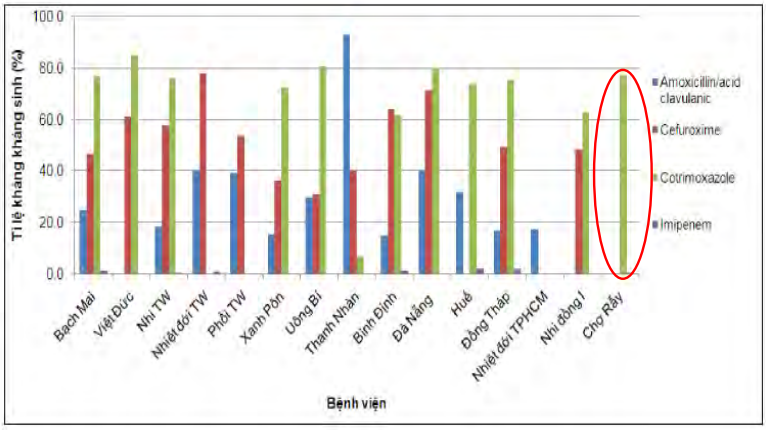
ANTIBIOTIC RESISTANT OF *S.AUREUS*



ANTIBIOTIC RESISTANT OF *K.PNEUMONIAE*



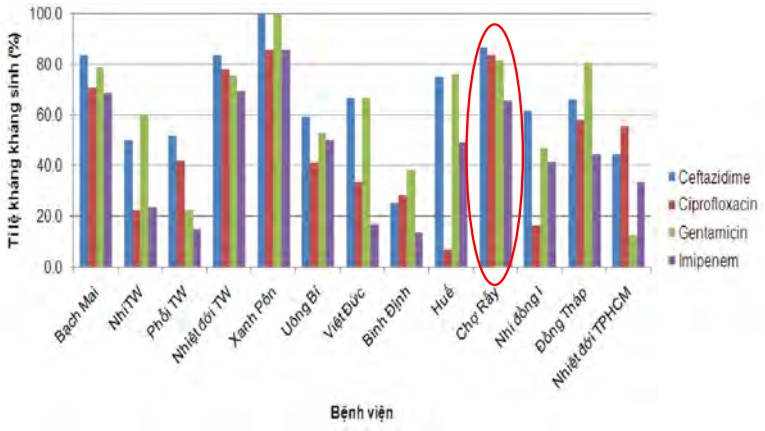
ANTIBIOTIC RESISTANT OF *E.COLI*



About resistance of Staphylococcus aureus, and this is the resistance, and this is the name of the hospital, and this is my hospital. The resistant staphylococcus aureus and oxacillin is about 20%. And about resistant of Klebsiella pneumoniae, in my hospital also resist with ceftriaxone or

cotrimoxazole, but sensitive with imipenem – and antibiotic resistance of E. coli and also resist with cotrimoxazole. Pseudomonas resistance is about 40% of ceftazidime and ciprofloxacin and 20% for imipenem.

ANTIBIOTIC RESISTANT OF *ACINETOBACTER SPP.*

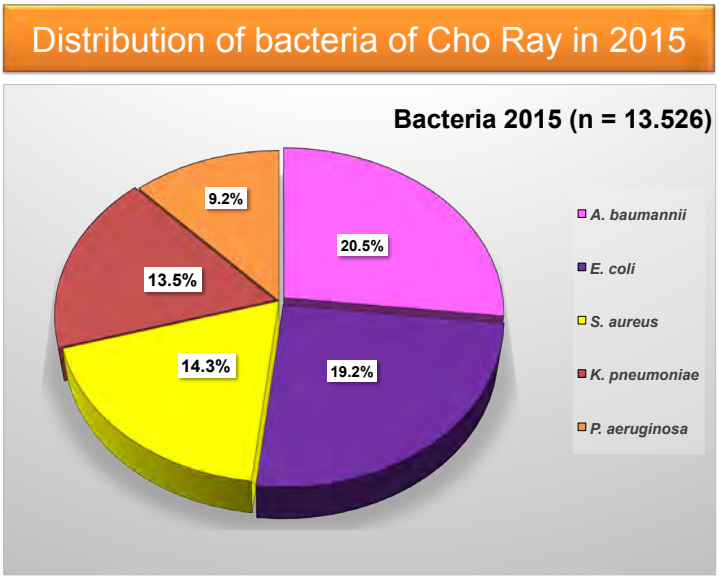


Acinetobacter is resistant to ceftazidime, ciprofloxacin, gentamycin, and imipenem over 50%, and the data is different between hospital.

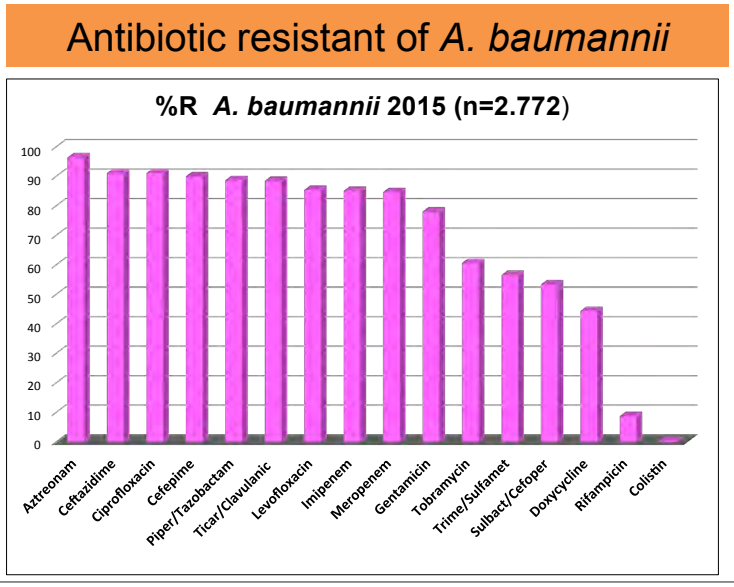
ESBL (+) OF *E.COLI* AND *KLEBSIELLA SP.*

Bệnh viện	*E. coli*	*Klesiella* sp.
Bạch Mai	18.0 (175/970)	3.0 (3/99) (Phân lập từ BP máu)
Nhiệt đới TW	54.7 (64/117)	72.7 (176/242)
Nhi TW	37.6 (146/388)	51.3 (294/573)
Phổi TW	23.4 (11/47)	7.0 (21/298)
Việt Đức	57.3 (63/110)	48.5 (16/33)
Xanh Pôn	31.7 (52/164)	41.2 (42.102)
Thanh Nhàn	41.2 (7/17)	12.5 (1/8)
Huế	33.9 (103/304)	37.5 (69/184)
Đà Nẵng	23.9 (112/468)	13.2 (58/438)
Bình Định	35.8 (210/586)	54.3 (227/418)
Nhi đồng I	38.1 (275/722)	54.1 (392/724)
Đồng Tháp	14.7 (78/531)	25.0 (56/224)
Chợ Rẫy	49.0 (25/51)	58.2 (139/239)
Nhiệt đới TPHCM	34.8 (24/69)	20.5 (9/44)

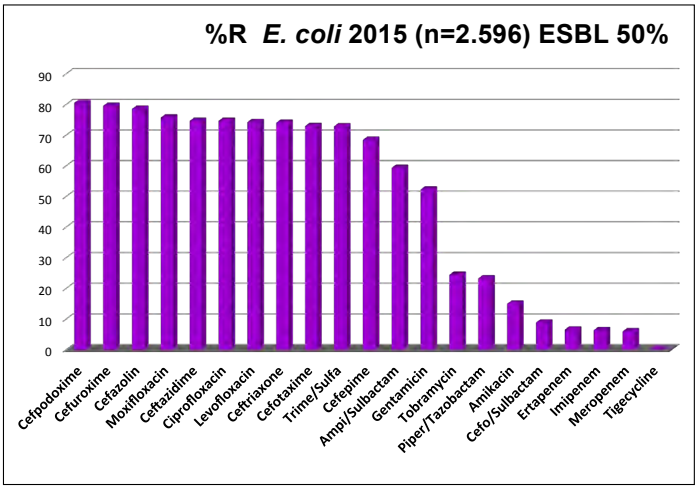
At that time, I think the data is not very confident because we don't use the machine to identify or make sensitivity; about ESBL, 49% of E. coli and 58% of Klebsiella.



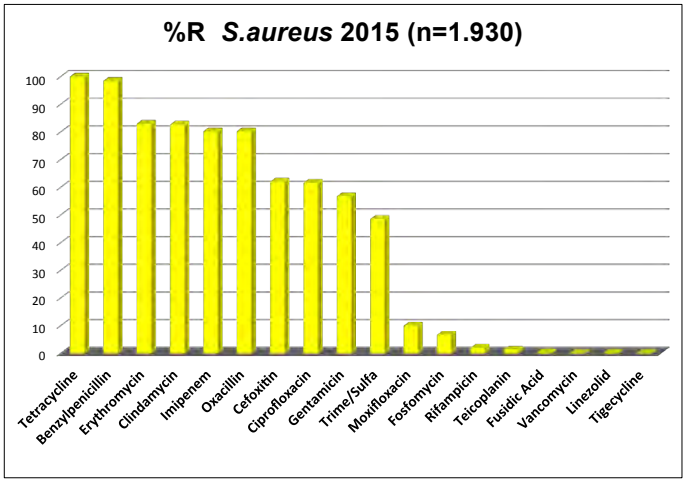
This is the data of my hospital in 2015. I think we are confident with the data because now we use the machine to identify the bacteria and make drug sensitivity; in 2015, we isolate about 13,526 bacteria, and almost done this Acinetobacter baumannii 20.5%, and the second one is E. coli, 19.2%, and the third is Staphylococcus aureus 14.3%, and the fourth is Klebsiella pneumoniae 13.5%, and 9.2% for Pseudomonas.



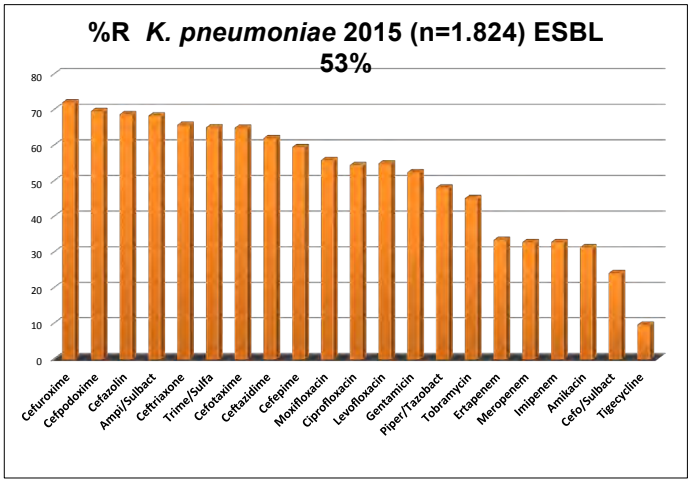
Antibiotic resistant of *E. coli*



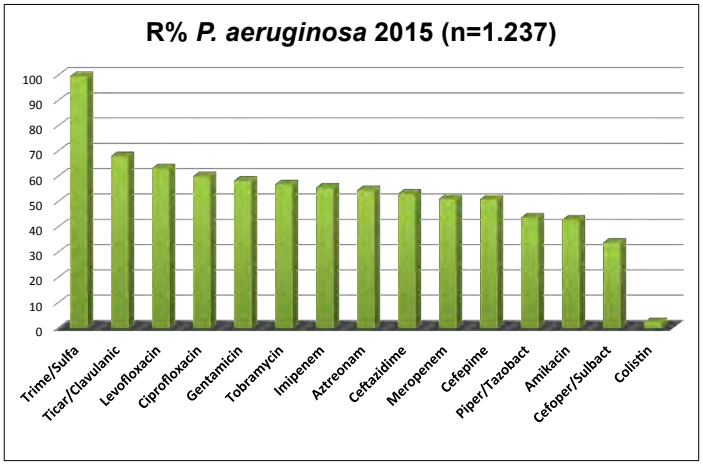
Antibiotic resistant of *S. aureus*



Antibiotic resistant of *K. pneumoniae*



Antibiotic resistant of *P. aeruginosa*



About antibiotic resistance Acinetobacter in 2007, 172 of Acinetobacter, they resist with almost the antibiotic with colistin and rifampicin. About E. coli, our resistant with antibiotics, and sensitive with imipenem, meropenem, and tigecycline. Staphylococcus aureus also resist with many antibiotics, but we have many antibiotics to use for staphylococcus aureus. And about K. pneumoniae also resistance is high, especially is ertapenem, meropenem, and imipenem significantly increased in this year, year-by-year if compared with 2008 or 2009, now our resistance is over 30%. About Pseudomonas aeruginosa, the resistance is over 30% for almost all antibiotic and just 2% for colistin.

Problems

- Easy to buy antibiotic in pharmacy (w/o prescription).
- Unsuitable using antibiotic in argiculture.
- Using antibiotic for children with mild respiratory infection.
- Unsuitable using preventive antibiotic in surgery.
- Overload of hospital and old infrastructure.
- Lack of financial.

The problem of my country I think is, like China before, easy to buy the antibiotic in a pharmacy without prescription; although the Ministry of Health have a law, it is very easy to buy.

It is unsuitable to use antibiotic in agriculture, for children with mild respiratory infection, and as prevention antibiotic in surgery; every surgery they use antibiotic, and the most problem I think is a lot of the hospital and all infrastructure, and so like the financials to make the survey.

Anti-resistance strategies

- Repairing infrastructure and anti-overload.
- Training in the use of antibiotics in hospitals
- Risk stratification
- Antibiotic Usage guidelines (base on microbiological data of hospital)
- Preventive antibiotics in surgery
- Monthly multi resistant bacteria report
- The monthly report of hospital infections
- Comment medical record use of antibiotics
- Maintaining handwashing
- Isolation, infection control in hospital

I think the strategy for anti-resistant to repairing the infrastructure and anti-overload and training in the years of antibiotic in hospital, research stratification, antibiotic usage guidelines based on the microbiological data of hospital, preventive antibiotic in surgery and mostly multiresistant bacteria report, monthly reports of hospital infections and comment medical record use of antibiotic, maintaining the hand washing and isolation infection control in hospital.

Step 1: System change

Hand sanitizers available at the point of care for staff, patients and their family

In the infection control department, we have a strategy to solve a problem. First system change, set hand sanitizer available at the point of care of staff, patient and their family, and access to safe, continuous water supply, soap and towels, and training.

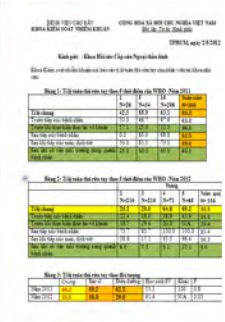
Step 2: Training and Education

Onsite lecture and practice

Check microbes in hand before and after practicing of washing hand

The hand wash education for nurse and doctor through the machine, check microbes in hand before and after practicing of washing hand.

Step 3: Observation and feedback



Hand Hygiene compliance is measured, reported and motivated

Observation and feedback, and they go to visit to work and to see how the nurse maintain hygiene and hand hygiene compliance is measured, reported, and motivated.

Step 4: Reminders in the workplace

Variety of posters, pamphlets, stickers, gifts..

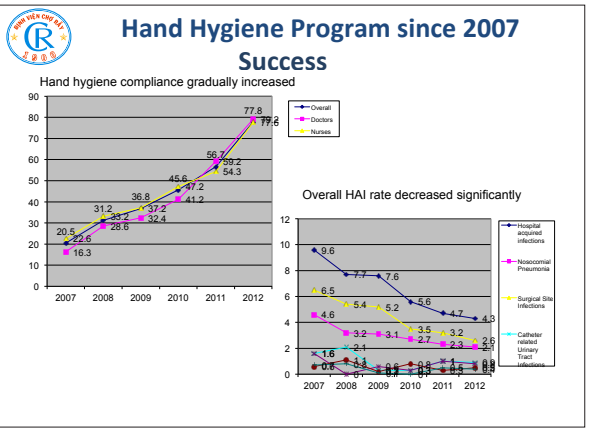
Step four is reminders at the workplace. We have many panel for our hand wash and increase washed hand, and don't let the bacteria grow up.

Step 5: Institutional safety climate

Activities of hand hygiene competition ceremonies

Step five we have some contest about infection control.

Asia Pacific Hand Hygiene Award 2013



They got Asia Pacific Hand Hygiene Award 2013. Thank you very much for your time.

Q & A

Dr. Omagari: Thank you very much. Do you have any comments or questions?

Dr. Sivaraman (India): Thank you for the nice presentation. My question is there is unusually high number of Acinetobacter in every department, and most of them are MDR, I can see only colistin is sensitive to it. You get Acinetobacter everywhere, and responding only to a very toxic drug, hope they treat this and is there any environmental reason for this? Acinetobacter everywhere not only one department orthopedics, ICU, respiratory ward, everywhere there is Acinetobacter, and most of them are resistant organism. I think there is something – there is a common source of Acinetobacter, any comments about it?

Dr. Phu (Viet Nam): Yes, that is the problem of my hospital. A lot of Acinetobacter baumannii, but I think because of over load of my hospital, and sometimes two patients in one bed in many wards, so we cannot solve the problem until we can isolate the case, and we also use the colistin in that case.

Dr. Omagari: Any other questions or comments? ...Thank you. I have visited his hospital more than a couple of times and it is a very busy hospital, big hospital. However, his hospital is the central hospital in the south side of Vietnam, so sick patients go down to his hospital, so that is why they don't have enough.

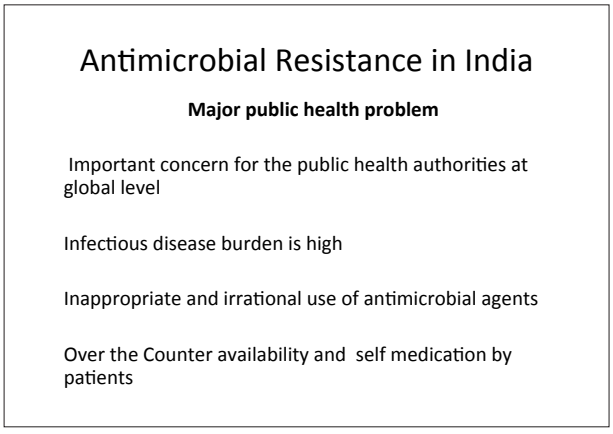
IV

Anti-Microbial Resistance in India

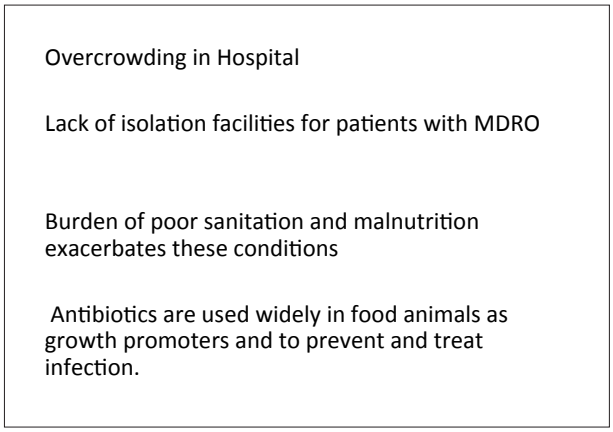
Dr. Thandavarayan Murali
Senior Assistant Professor, Pediatric Emergency Department
Institute of Child health and Hospital for Children
Dr. Thirumalaikumarasamy Sivaraman
Senior Assistant Professor, Pediatric Intensive Care
Institute of Child health and Hospital for Children

Dr. Omagari: Our fourth speaker is from India, Dr. Murali. He is a senior assistant professor and also in pediatric emergency medicine from the Institute of Child Health and Hospital for Children.

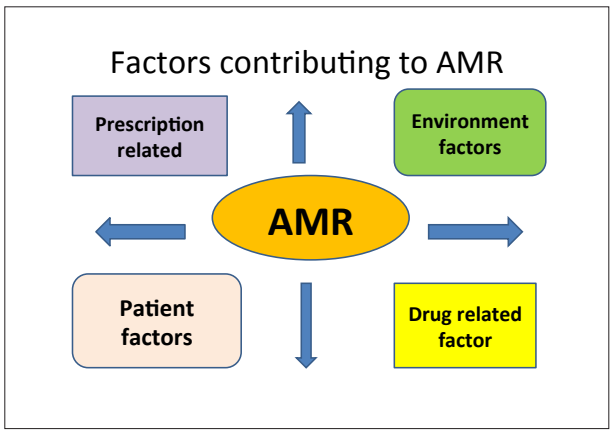
Dr. Murali: Good afternoon to everyone. I would like to thank JICA for giving us an opportunity to participate in this program and to make us to work effectively than before. Thank you very much. As usual, it is not my formal presentation. I thought it is between our member. It is just a simple presentation. I will try to do my best.



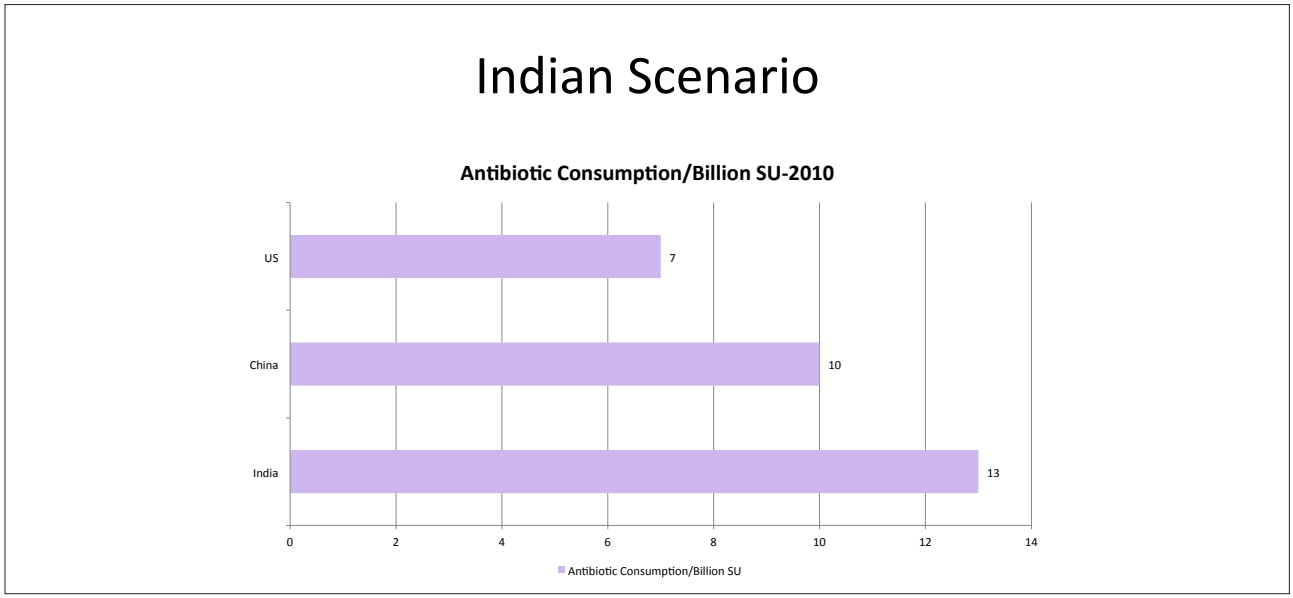
AMR in India is a major public health problem. It is not only in India, it is a global problem, what we are facing now, it is almost like a world war, may be antibiotic world war we have to fight. Definitely, we have to win. It should be a multidisciplinary approach, and the burden of the infectious disease is very high in India, and we have inappropriate and irrational use of anti-microbial agent, not only by the doctors, it is by the patient, most common they have self-medication and the drugs are getting over counter, and overcrowding in the hospital.



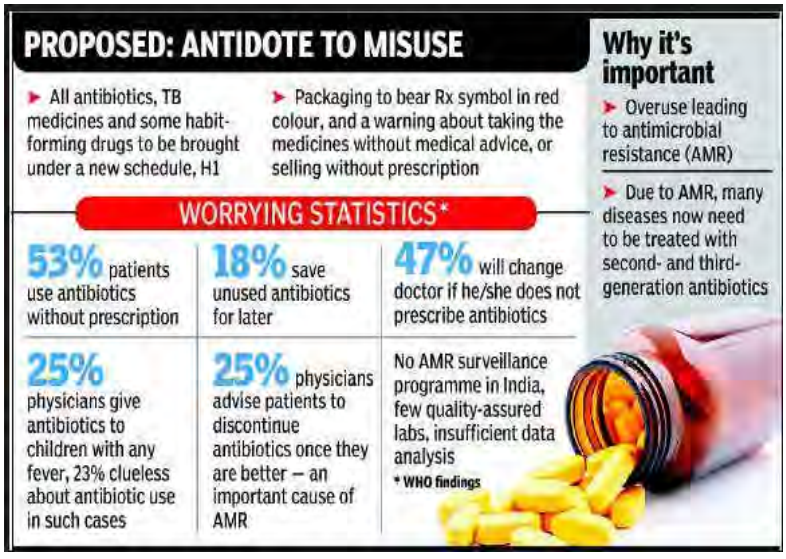
One bed, two patients, is it possible, I don't know, we have maybe 30 bed, we have 140 patients sometimes in epidemic, so we find it very difficult, but usually one bed for one patient only, others have to lie down. So this overcrowding in hospital causes multiresistant organism. Lack of isolation facility for patient with multiresistant organism and burden of poor sanitation and malnutrition exaggerate this condition. Antibiotics are widely used in animal husbandry as a growth promoter. This is now a burden for us to have antimicrobial resistant and even multidrug resistant organism.



These are the factors contributing to the AMR, among which the environmental factor is more dangerous because we are most concerned about our patient factor, drug-related factor, and our doctor factor, but what about the environmental factors? Environmental factors are now going to be a very major contribution along with this patient factor. We have to focus on this in managing this AMR.

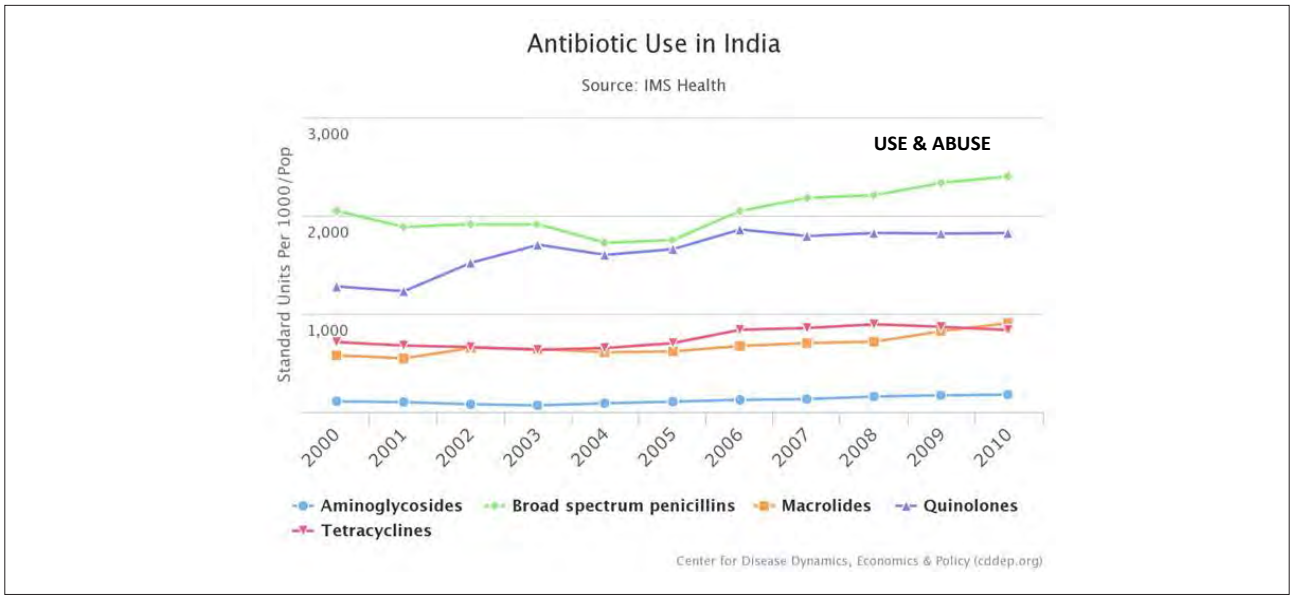


This is the Indian scenario. The largest consumption of antibiotic has been compared with the countries; India, China, and the U.S. where they found that India is consuming around 13 billion standard unit of antibiotic in 2010 strategy where it is alarming. As my colleague Dr. Shivraman from India has said, antibiotic is not antipyretic, that is what we as pediatrician believe and we will not give antibiotic as an initial treatment for any fever case, but this is very alarming, and it is now pushing to the death end.

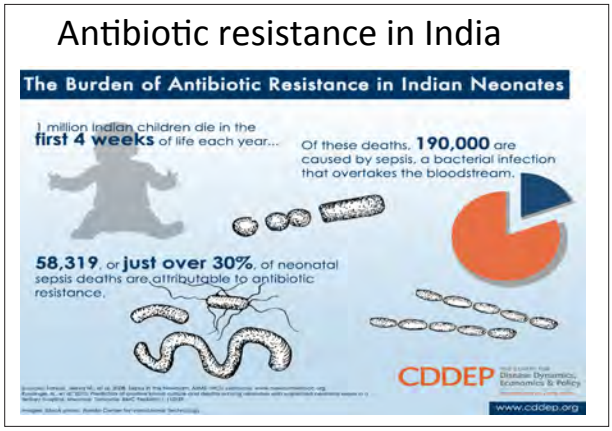


This is on the article on antibiotic misuse. You can see that 53% of patient use antibiotic without prescription, so it is available over counter and 18% save unused antibiotic for later, so they usually take it for two days, after it improves then if they come for next visit, we will ask, have you taken for five days, no doctor, it has improved by two days why should I take it for five days, so now this contributes to the 18%, 47% will change doctor if we don't prescribe antibiotic. Now that is what our Bangladesh friend is asking, if I am not giving antibiotic what this person will do, we better leave the person, let him go to some other place that will be the better option. Further, 25% of physicians give antibiotic to children with any fever, so that is what they think it is antipyretic, 23% among this it is too less antibiotic unit in such cases. We have seen many cases who come to our OPD by practice where they will give antibiotic, for example, ceftriaxone, and injection gentamicin for URI, one-day fever, cold and cough, what happened, these people go to the other doctor and asks for suggestion, should I have to continue this antibiotic for five days, and the other person will say who told to give all this injection for this simple URI, then that fellow will stop that also. We are contributing now toward major cost for antibiotic resistance.

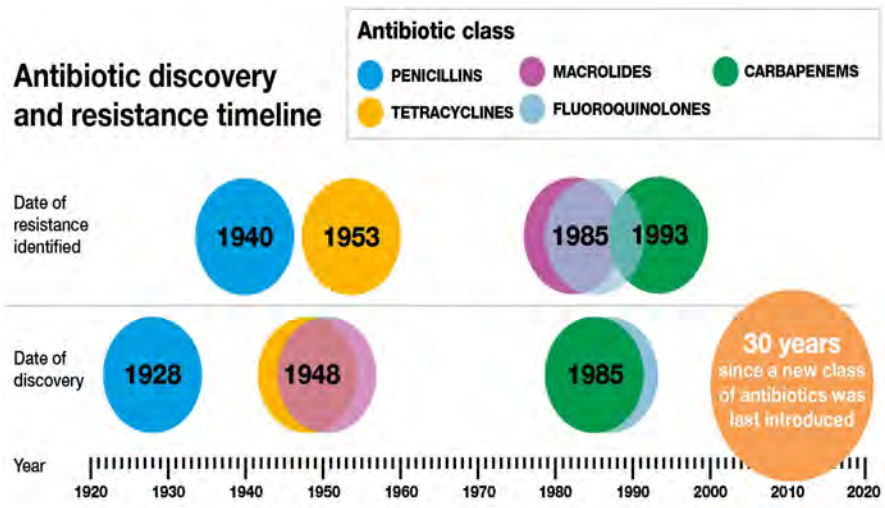
Further, 25% of physicians advice patients to discontinue antibiotic once they are better, an important cause of AMR. The problem in India is we don't have sufficient data or surveillance to know much about AMR, maybe it is limited to some part, some place, but we are not even fully entered even in a government setup.



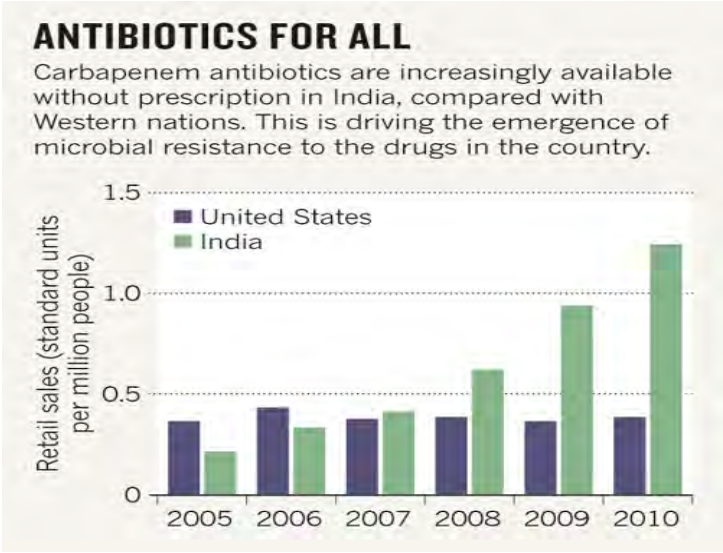
This is the antibiotic use and abuse in India. So you can see that the antibiotics have been used for long years, so as our friend Dr. Zhu said, the antibiotic consumption has also reduced, I won't make my China to become totally green, but it is allowing us – the consumption is totally increasing throughout.



With regard to antibiotic resistance in India, 1 million Indian child die in the first four weeks. Among these – majority of them died due to sepsis and septic shock, about 30% of these kids die due to antibiotic resistance.



Furthermore, 30 years discovery of the antibiotic, so we have antibiotic from a long time, but now we don't have any newer antibiotic to fight against these antimicrobial resistant or multidrug resistant organism, it is very difficult. We have around more than 600 new drugs, around 617 new drugs, but only 15 drugs are known to act against in a different mechanism what the usually drug act, so now we are pushed toward a pre-antibiotic era where you will not have any antibiotic for even a minor illness where it may lead to increased mortality.



This is a study as carbapenem antibiotic now become resistant, it is increasing throughout the year in Indian setup.

Location (year published)	Isolates	Organism	Resistance rate (%)	Reference number
NICED, Delhi (2007)	9888 stool samples	*V. cholera 01*	96 to furazolidone, Cotrimoxazole and nalidixic acid	[10]
Kolkata (2007)	284 clinical isolates	*metallo-beta-lactamase (MBL) producing bacteria*	43.3 were resistant to at least seven antibiotics (ampicillin, amoxicillin, cephalexin, ciprofloxacin, cotrimaxazole, erythromycin, gentamycin)	[11]
Lucknow (2007)	2995 blood samples	*Klebsiella spp.*	ESBL producing *Klebsiella spp.* were 98.28 resistant to ampicillin, ticarcillin and piperacillin. Monobactem and cephalosporin resistance was also higher (>60%).	[12]
Puducherry (2008)	261 clinical isolates	*Staphylococcus isolates*	72.34 of *staphylococcus aureus* resistant to oxacillin	[13]
Nagpur (2009)	1300 nasopharyngeal swabs from school children	MRSA	4.16	[14]
CMC Vellore, Various centres across India (2010)	176 clinical specimens	*P. aeruginosa*	Among the 61 *P. aeruginosa* isolates, resistance to carbapenem was 42.6.	[15]
Puducherry (2010)	31 clinical samples	*K. Pneumoniae*	93.55 multiple drug resistant and ESBL producer	[16]
Mangalore (2010)	83 CA-MRSA clinical isolates	Community-associated methicillin resistant *Staphylococcus aureus* (CA-MRSA) strains	92.8% were resistant to penicillin, 31.32 to erythromycin.	[17]
LokNayak Hospital, New Delhi (2010)	83 isolates from OPD cases of pyoderma	CA-MRSA	9.6	[18]
Mangalore (2010)	180 clinical samples	Enterococcal strains	16.67 to 42.86 to aminoglycosides	[19]
Sikkim (2011)	291 clinical specimens 196 carrier screening nasal samples	MRSA	38.14 in clinical specimens 20.92 in nasal samples	[20]
Tertiary trauma	3,984 clinical	*Gram Negative*	Overall resistance of gram negative	[9]

So these are some of the studies, we have few data collection in India where they didn't study in some part, you can see that only very few places being concentrated; Delhi, Kolkata, Lucknow, Puducherry, Nagpur, CMC Vellore, these are all the good center with good lab support and they have good computer session and also have a good IT set of people where they collect data and tell what is happening every day and every month. Here you can see these datas where the organism has now been, metallo-beta-lactamase is a new organism, New Delhi metallo-beta-lactamase. It is resistant to all antibiotics, there is an antibiotic for such organism. So, we are now pushing toward multidrug resistant organism. This is the rate, for example, you can take Puducherry, you can see that Klebsiella pneumonia; 93.55% multidrug resistant and ESBL producer, now we are pushing toward dangerous zone.

- Antimicrobial use and resistance in five pilot sites in India (Delhi, Mumbai, Vellore) showed very high AMR rates to cotrimoxazole and amoxycillin (>70% for *H.influenzae*)

J Nat Sci Biol Med. 2013 Jul-Dec; 4(2): 286–291

Antibiotic is other study, antimicrobial use and resistant in five pilot study in India; Delhi, Mumbai, and Vellore showed very high antimicrobial resistant rate to normal antibiotic more than 70% for H. influenzae.

Way Forward ?

Develop and strengthen antimicrobial policy

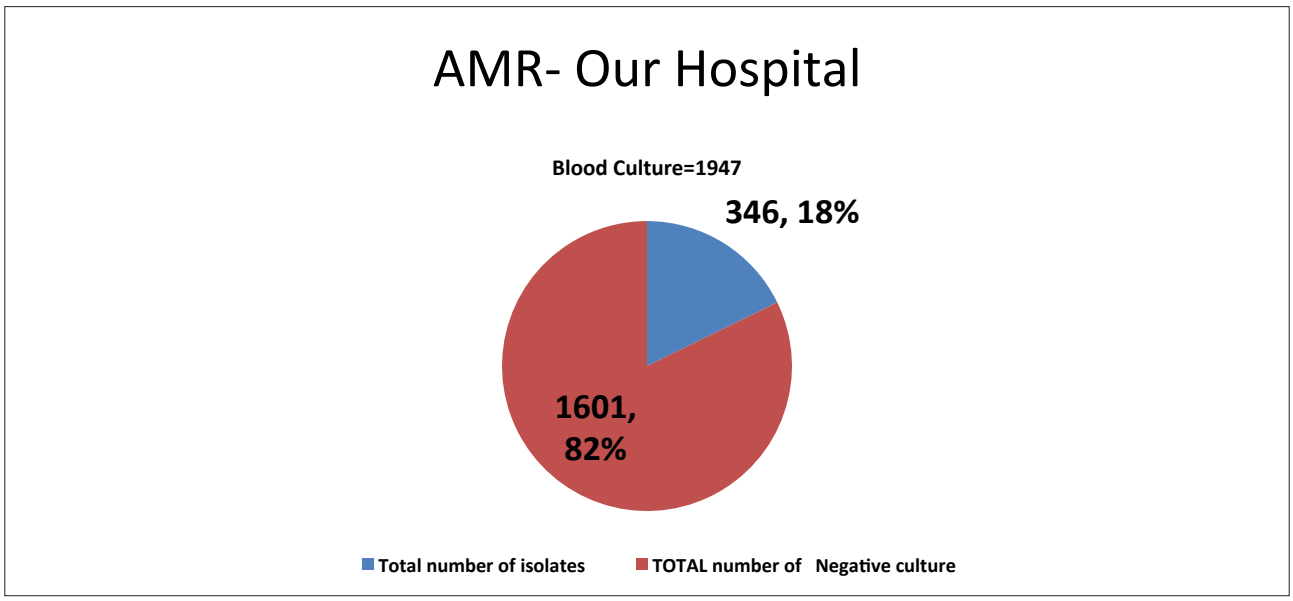
Standard treatment guidelines

National plan for containment of AMR

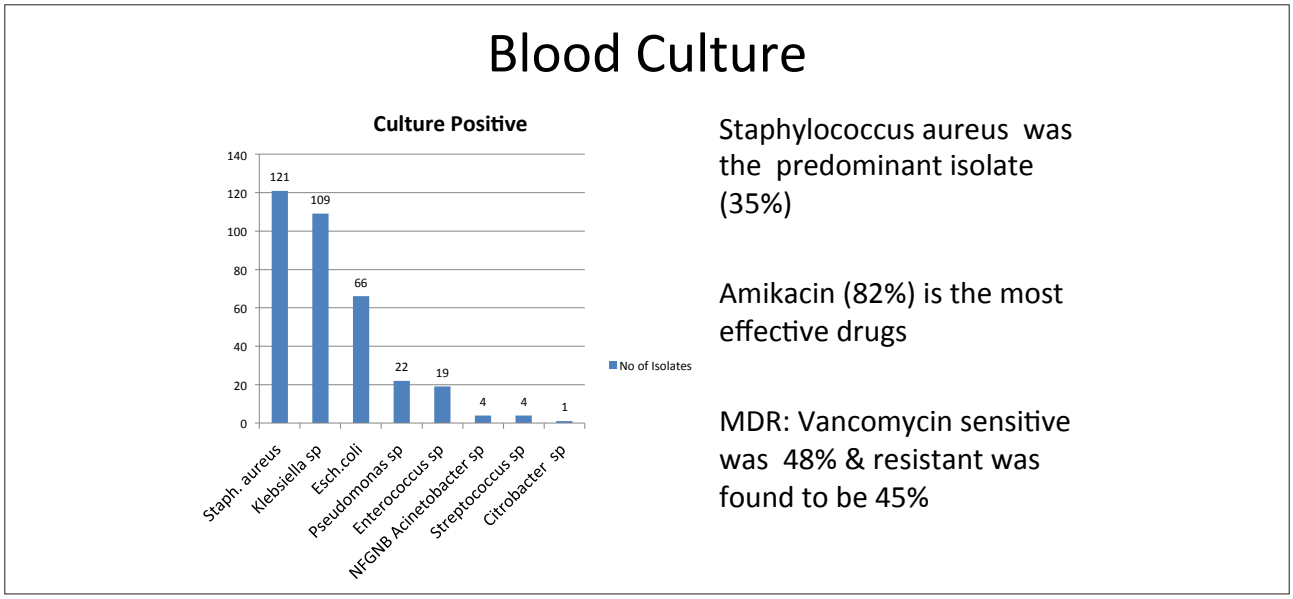
Research related to AMR at community and hospital level

So, way forward to develop and strengthen antimicrobial policy, standard of treatment guidelines, national plan for containment antimicrobial resistant, and you must have research related to antimicrobial resistant at community and hospital levels.

This is our hospital, my working place in the pediatric emergency department, and my chief is about to intubate that child, to be proud. My chief Dr. Indumathi santhanam has been trained here in JICA one year back for a two-month training in administrative issues. Now we are working as though we are working in Japan, so there has been a modification now even in our own personal behavior and discipline, including that of the doctor and the staff nurse.

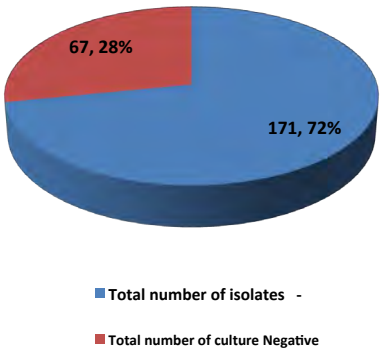


We have a large volume of cases every day, so this is our antimicrobial resistant data. There is a blood culture, positive cases are around 346, 18% for blood culture positivity and among this the Staphylococcus aureus.



You can see the Staphylococcus aureus being the top most and next is the Klebsiella and E. coli. It is around 35%. It is sensitive 82% for amikacin, and it is a multidrug resistant – sensitive to vancomycin sensitivity was 48%, and resistant now was found to be 45%. We may not have yet a drug to treat even this condition.

PUS & OTHER BODY FLUIDS



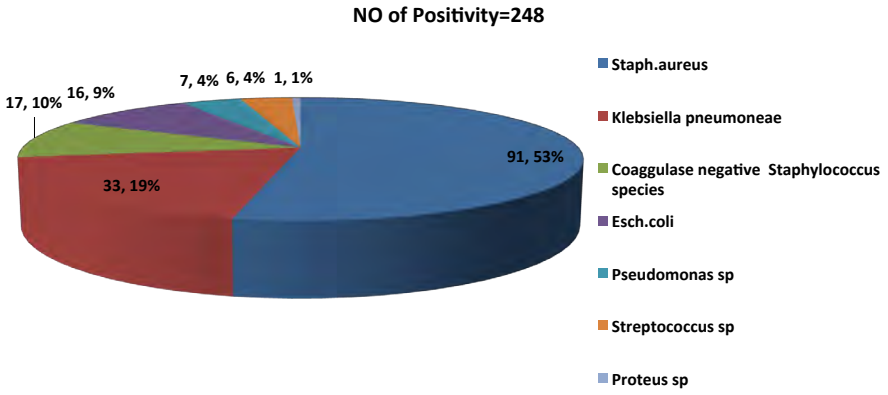
Staph aureus was the predominant isolates (53%)

Amikacin (76%) was the most effective drug against Staph aureus

MDR :Vancomycin 37% isolates are sensitive and resistance.

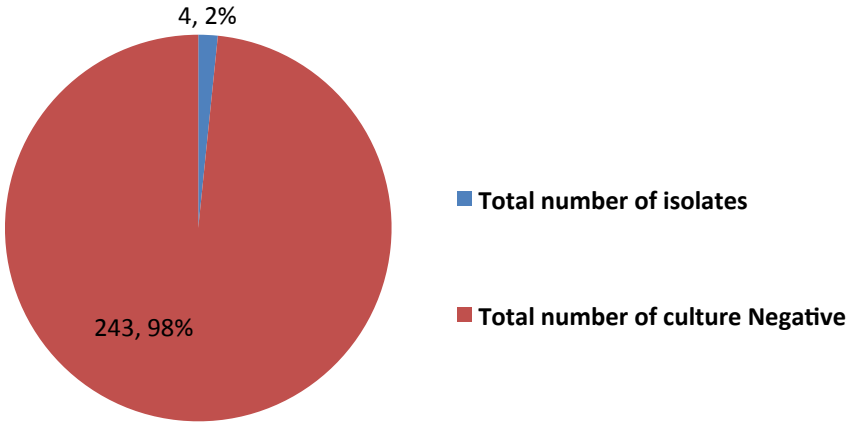
Next, the total number of isolate culture positive is 177 in percent, other body fluids, but staphylococcal organism will predominate 53%, and the multidrug resistant for vancomycin is now 30% isolative or sensitive and it is also resistant.

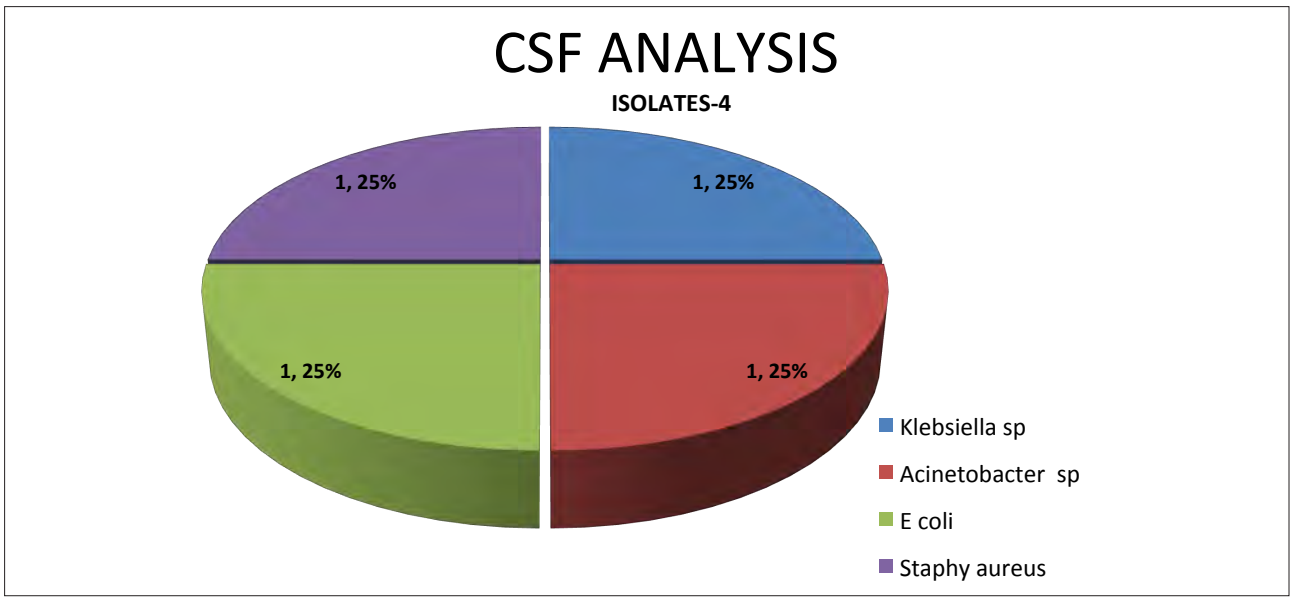
Pus and Other Fluid Culture



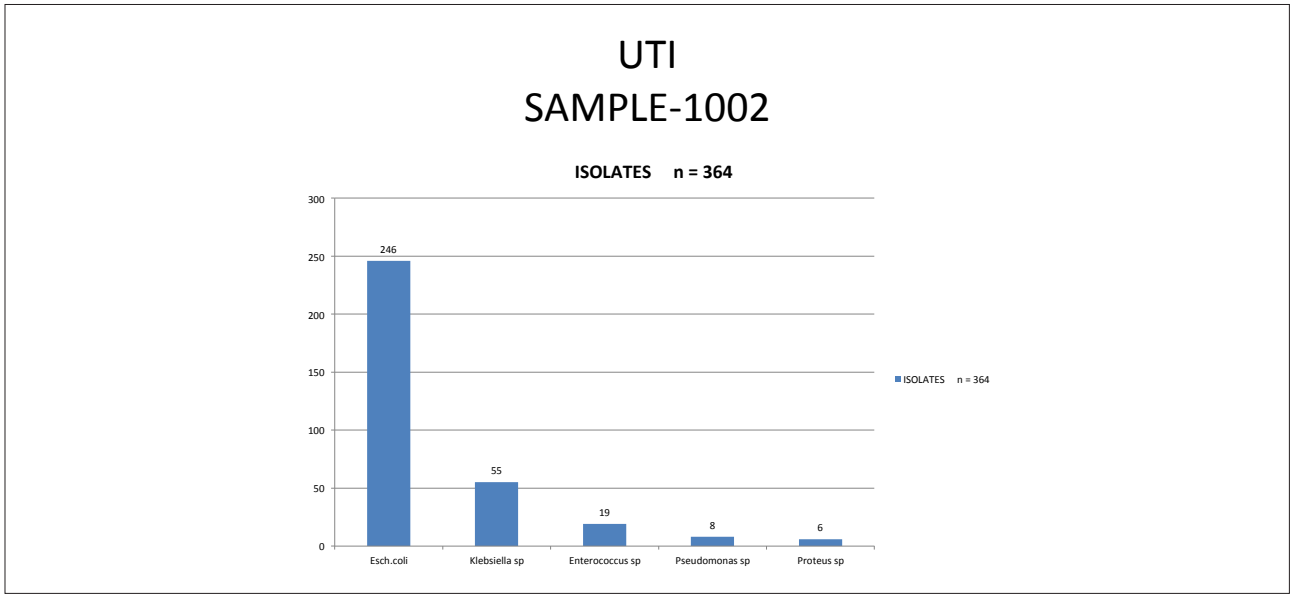
These are various organisms.

CSF ANALYSIS-247





CSF analysis, we have done for 247 cases among which the total number of isolate is four and it is equally distributed one Klebsiella, Acinetobacter, E. coli, and staphylococcal, till now there is no multidrug resistant organism we have isolated.

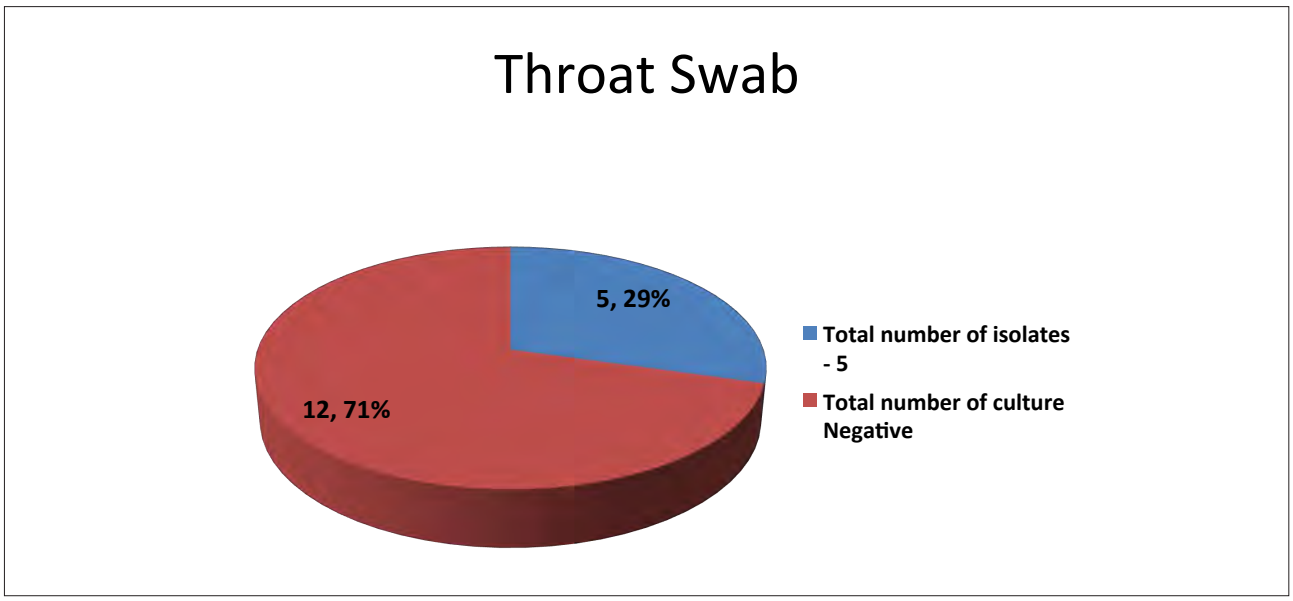


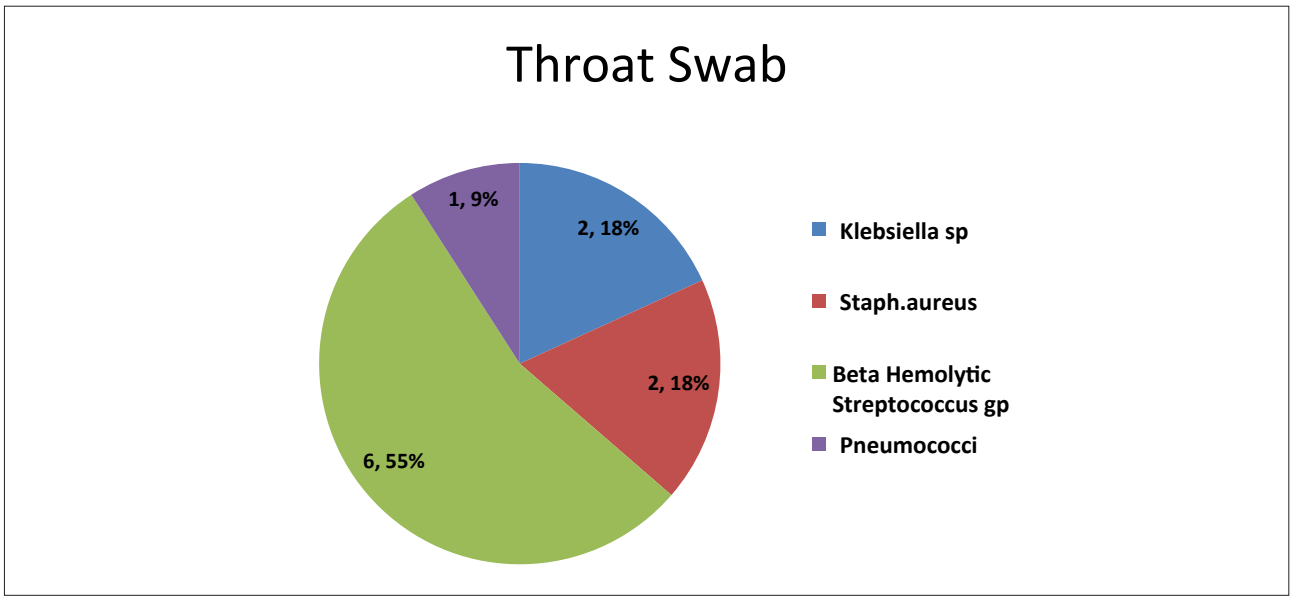
URINE CULTURE

Esc coli (65%) was the predominant isolates
Sensitive to Amikacin, the most effective drug

MDR: 27% isolates were sensitive, 3% MS and 0.8% resistance to Imipenem

The urine sample, the culture positive, the E. coli being the top most, and it was a prominent isolate sensitive amikacin, the most effective drug, and 25% isolate sensitive and 3% or medium sensitive and 0.8% resistant to imipenem.





The throat swab culture is a different organism. Here also the most common organism is the beta-hemolytic streptococcal.

Conclude

Staph aureus, Klebsiella sp,E coli -Common

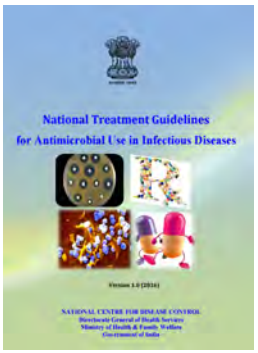
56% of these isolates were sensitive to Amikacin & fluroquinolones.

MDR(24%)-Multidrug resistance to routinely used antibiotics such as Ampicillin, Gentamicin, Amikacin, Cefotaxime & Ciprofloxacin

All these MDR isolates were sensitive to Imipenem,Tigecycline,Colistin and Piptaz

To conclude my hospital report, Staphylococcus aureus, Klebsiella, and E. coli are common. Further, 56% of the isolate sensitive to amikacin and fluoroquinolones, and the multidrug resistant 24% were routinely used antibiotic such as ampicillin, gentamicin, amikacin, cefotaxime and ciprofloxacin, and all this MDR isolates are sensitive to now at present at least to imipenem, tigecycline, colistin and piptaz.

- The Indian Council of Medical Research (ICMR), New Delhi
- India, has launched the Anti Microbial Resistance Surveillance and Research Network (AMRSN) across the country in 2013



Now we have a national policy. It was first formed in 2011, now it has been revised, and for the appropriate use of antimicrobial infection disease control program, the government program, now it has revised for 2016, so it tells about your use of antimicrobial in a normal situation and also in drug resistant situations, and we have the initiative by Indian Council of Medical Research, New Delhi, it has launched the resistant surveillance and research network across the country in 2013.

National Guidelines

Recommended measures to control spread of Multi-drug resistant organisms (MDRO)

i. Improved laboratory detection and reporting of MDR

ii. Enhanced infection surveillance and control in ICUs

iii. Prevent spread by barrier precautions : Gown and gloves

iv. Hand Washing

v. Restricted use of 3rd generation cephalosporins and second line drugs

So, it is a national recommendation to split the control of multidrug resistant organism, improve laboratory detection and reporting of multidrug resistant, enhance infectious surveillance and control in ICU, prevent spread by barrier precaution like gloves and gown, hand washing, restrict the use of third generation of cephalosporins and second-line drugs. Now it has been the common cause of resistant, inappropriate use of third generation of cephalosporin for all the condition.

STATERGIES

- Development of an effective Infection Prevention and Control Program- ICC,ICT.
- Hand-hygiene and Standard Precautions
- Antimicrobial Stewardship Program
- Multidisciplinary Approach
- Educational Programs and Strategies

Strategies, development of an effective infectious, preventive and controlled program, so that is what we have come here to learn how to make it as an effective team leader and to make it as efficient program and to make our plan success, to take action plan to have a good infectious control committee and infectious control team. Hand hygiene and standard precaution and antimicrobial stewardship program and have a multidisciplinary approach. A single person cannot do, I think we need a multidisciplinary approach and education program and strategies.

- Notification
- Prophylaxis including Immunization
- Effective Isolation
- Proper Disinfection
- Data Collection, Surveillance, Audit
- Incentives

Notification and prophylaxis including immunization, effective isolation, proper disinfection and data collection surveillance and auditing our data, and incentives if they do better in their work.

MULTI DRUG RESISTANT ORGANISM

SI	ORGANISM	ANTIBIOTICS	
		FIRST LINE	SECOND LINE
1	Methicillin- Resistant S. aureus (MRSA	Vancomycin and Teicoplanin	Linezolid. Daptomycin
2	Vancomycin Resistant Enterococcus (VRE)	Linezolid	Tigecyclin
3	Extended Spectrum Beta-Lactamases (ESBL) Producing Enterobacteriacea	carbapenems (Ertapenem, Meropenem and Imipenem	Piperacillin–Tazobactam and Cefoperazone-Sulbactam
4	Carbapenem- Resistant Enterobacteriaceae (CRE)	Polymyxins, tigecycline & fosfomycin	Colistin
5			

These are all the multidrug resistant organism; methicillin resistant Staphylococcus aureus, we have vancomycin resistant Enterococci, we have extended spectrum beta-lactamase producing enterobacteriaceae and we have carbapenem resistant enterobacteriaceae. This number is going to increase if I am not stopping at this point, and we may not have even this first line of drug after some years.

Challenges

- Strengthening of Surveillance Data
- Standard Operating Guidelines
- Improvement in antibiotic prescription practices
- Over the counter sale of antibiotics
- Poor sanitation, endemic infections, malnutrition
- Limited public awareness and government commitment
- Lack of coordination and fragmentation of effort

Challenges; strengthen our surveillance data, and standard operation guideline, improvement in antibiotic prescription practice to avoid the over counter sale of antibiotic, to improve our poor sanitation, epidemic infection and malnutrition, limited public awareness and government commitment, lack of coordination and fragmentation of effort.

Disinfectant

Proper Hand washing


Training Staffs

Universal precautions

These are some of the things if we can use, even I feel after attending three or four days, I felt it is not related to very highly economic program, this can be simply done with what we are routinely doing in our work, if you do effectively our floor cleaning and the wall cleaning and proper hygiene technique. Usually in the class, today morning our staff from – we had morning class session where she told the most common task of organism, multidrug resistant antibiotic resistant organism will be around any wet area. So this is what - if I go to my place, then I have to look all those things how to prevent these organism to spreading from one person to another from a common source. For regularly cleaning our equipment – and the sterlium can be used between patient-to-patient, and take a universal precaution, wear glove whenever you prepare any infusions or any procedure and to training staff. My chief, we don't have time to go out for a coffee or to attend any audit meeting or similar because we are in emergency, so the training program start here itself, about anything it can be done in our place, so the infrastructure can be utilized wherever we are to make it as a sufficient program.

BIO MEDICAL WASTE MANAGEMENT

Team Concept

Biomedical waste management is now set up, and the team concept, multidisciplinary approach, not only the team concept in my hospital, I think it is a global issue, you must have international multidisciplinary approach to manage this situation.

Patient satisfaction that is what we have come here to learn. The first day I learned about what is patient satisfaction. Usually we see it, but when they stressed up on the patient satisfaction in my JICA training, then I just recollected and I just put the photo to show that we may have a good patient satisfaction when they go. This kids have been intubated on mechanical ventilator, there will be under care of ICU, Dr. Shivaraman, and it will come to us as follow.

This is total thing. How you can get this kind of quality of neurological intact survival child, good-quality child is – main agenda now is going to be our antimicrobial resistant organism, so we have to handle, tackle this situation.

The last slide, it is very interesting for me, it is donated by the JICA to Institute of Child Health in Egmore. It is around 98 crore project. It is exclusive for emergency department and outpatient department. The thing is we have now got more space, infrastructure, and we have asked the government to give a manpower, yes, they said okay, then we told that we need computer session to all this rooms so that we can have a good data collection and surveillance, yes, they said, okay, and we asked for the additional manpower and things, so it is all being accepted to make our success – our program to be success. Thank you very much for giving this opportunity. Thank you.

Q & A

Dr. Omagari: Thank you very much. Now this presentation is open to comments and questions.

Dr. Sakurada: Thank you very much for the nice presentation. At NCGM, we have a research project in Nepal is the neighbor of India, and the pathologists in NCGM identify NDL, but I know a number of people back and forth between two countries, so that is a frequent movement of the people, and what about animal meat importation and exportation between the neighbors? This is my first question. Second question is, do you have any international friend among some country means Bangladesh, Nepal, and other countries?

Dr. Murali: There is some regulatory part for these things, but it is not as effective. It is still going on, and that is why we are facing these type of issues. Regarding the international disciplined approach, but we are now in a fetal phase or just newborn where we need to have data collection and good surveillance, so that we can come out and to be a part of multidisciplinary approach.

Male Speaker: Let me add to what Dr. Murali said. Thanks for the excellent presentation. Regarding first animal meat. As we all know that there is an indiscriminate use of antibiotics in animal veterinarians and in people even who the animals to increase the weight, so that they can make more profit, so that is a real issue, and regarding India, Nepal it is a follow spot. We don't need to have anything to move around India and Nepal, so it is difficult, it is difficult to control. For animals, there might be some quarantine or something, but it is not very strict, so there is a strong possibility of infection being transmitted from Nepal. I have gone to Nepal and I know that it is very easy to enter Nepal if you are Indian. You need to have a passport, you just go, show your ID card, you can enter Nepal, so that is a real issue, but especially in the northern part of India. First, there might be an issue regarding transmission of antimicrobial resistance. Second, among SAARC countries, I am not sure because SAARC is not very active nowadays due to various issues. As you said, the first government policy came out in 2011, so hardly five years back, so that awareness and this came out 2011, and there was again 2013 guidelines and 2016, but I am not sure about coordination among SAARC countries, I am not sure about that. I don't know about any antimicrobial resistant network or some policy amongst SAARC country, but there is definitely a very good – it should be a very good initiative because the pattern of infection is same and because the food they eat and cultural practices are somewhat similar, so that is a point well taken which will be represented to the government if we go back, but the other thing is antibiotic use in animal, transmission to human and soil is probably bigger, slightly different in different geographical limits.

Dr. Sakurada: Thank you very much. I have one more question to Dr. Zhu from China. Fifteen years back, I visited the border area between China and Myanmar, and China and Laos, and you have so many neighbors, and actually the people very easily cross the border. Daily people from Myanmar visit China for shopping and if they suffer serious disease, they visit the hospital in China and admit. I have a similar question to you. What about such quarantine or control over live animal and cooked animal meat, including the poultry and human movement control.

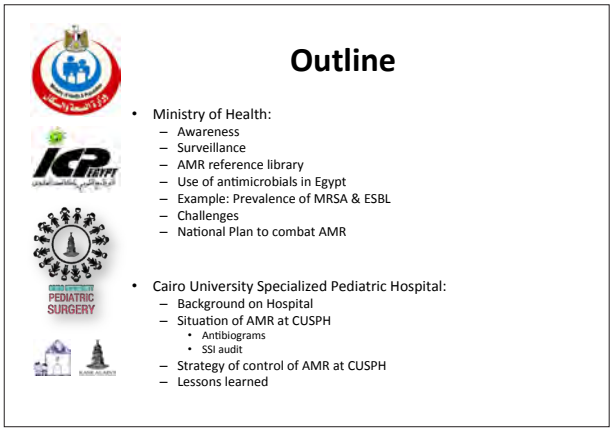
Dr. Zhu (China): Thank you for the question. Actually I am not the right person to answer that, it should be officials. Actually I think that it is restrictive to bring things through flight or something because they will check that. Many things, many restrictions to check that actually. The other one is about the communicable diseases, so usually when people come to China from airport, and then you will get the temperature checked, and then if he or she is admitted to the hospital, we will report that to the hospital or to the government, they will be in the network to surveillance that, so maybe that answers your question. I am not sure about that. Okay, thank you.

Anti-Microbial Resistance Situation in Egypt

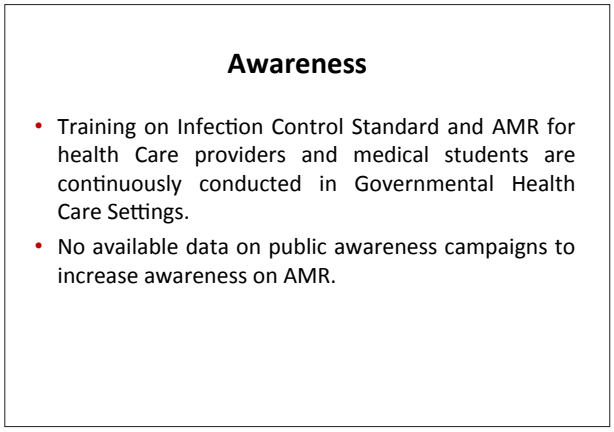
Dr. Yasser Kandeel
Head of Infection Control Department, Egyptian Ministry of Health and Population

Dr. Aly Shalaby
Lecturer and Clinical Lead for the SNICU / Pediatric Surgery Department
Cairo University Specialized Pediatric Hospital

Dr. Omagari: Our fifth Speaker is from Egypt, Dr. Ali and he is a lecturer and clinical lead for pediatric surgery department at the Cairo University and also a specialized pediatric.



Dr. Ali(Egypt): Ladies and gentlemen, it is a great honor to be able to speak on behalf of Egypt in this lovely meeting. My talk is going to be divided into two sections. Dr. Kandeel is representing the Ministry of Health, so I will talk about the Egyptian – the overall country status of AMR. Then, I will be speaking about my own perspective from the hospital where I work and as a pediatric surgeon in charge of neonatal surgery, I am going to be speaking very specifically about children and surgical problems.



MOH

The general outline is in the Ministry of Health we are going to talk about awareness in Egypt, surveillance, our antimicrobial reference library, the use of antibiotics, we will give you an example of a study that was done, then our challenges and our national plan. Regarding my hospital, I will just give a quick review about what it is about, and then our antimicrobial resistance in the hospital in general, and our strategy, and we will have a little bit of a conclusion. In the Ministry of Health, generally we train all aspects of infection control and we have a huge project that is going on of which Dr. Kandeel is the Director, but we don't have any awareness, we don't have any data on the level of public awareness of antimicrobial resistance.

Surveillance

- There is surveillance system implemented in 27 Governmental hospitals.
- There is monitoring system for antibiotic use in governmental health care facilities.

We have about 450 hospitals throughout Egypt surveying 90 million plus citizens. We currently have active surveillance on 27 of these hospitals, and every year we add 20 extra hospitals hoping to be able to survey all 450. By 2017, we will have 47 hospitals under surveillance, and obviously we have this monitoring system.

AMR Reference Laboratory

- There is a National Reference Laboratory for sensitivity testing .
- Laboratory quality accreditation system is in place
- Participates in External Quality Assessment with WHO every 6 months

We have a national reference laboratory for sensitivity testing, which at the current state is actually duplicating results, so lots of tests are sent locally at the local hospital where the patients are, but they are also sent to the central laboratory for testing for quality control, but as we are bringing in new automated and online systems for recording data, we are going to be able to get rid of this duplication and just have everything in a centralized database. We regularly participate with the WHO in quality assessment.

Use of Antimicrobials

- Antimicrobials can be sold without prescription
- Standard treatment guidelines available only for some specialities in some hospitals.
- Use of antibiotics is monitored in humans

Like many of my colleagues, we have heard that Over the counters antibiotics are easily available, this is a huge problem, and we don't have standardized treatment guidelines. However, the use of antibiotics in human subjects is jointly monitored between the Ministry of Health and the Ministry of Agriculture.

The prevalence rate of MRSA and ESβLs in ICUs

- The Infection Prevention and Control Department conducted in 2013 in collaboration with World Health Organization (WHO) a multi cross sectional study aiming to determine the prevalence rate of MRSA and ESβLs infections and colonization in 20 tertiary ICUs in 7 Egyptian governorates.
- Overall prevalence of MDROs: 23.2% (N=2969).
- 757 patients (80.4%) out of 941 patients, use one or more antibiotics.

I am assuming. I don't know that the Ministry of Agriculture is also monitoring the use of antibiotics, but they monitor it in animals. Part of our joint efforts with the WHO is this example study that was done in seven Egyptian governorates. Basically, it found that the prevalence of multidrug resistant organisms is just under 25%.

Challenges

1. Limited national commitment and poor intersectoral cooperation.
2. Limited public awareness.
3. Unauthorized irrational public use of antibiotics.
4. Shortage of competent microbiology laboratories.
5. Poor surveillance data on antibiotics use and resistance.

6. Inadequate knowledge of health-care providers leading to improper prescription and dispensing practices.
7. Lack of updated treatment guidelines resulting in the inappropriate prescription of antibiotics.
8. Poor infection control in some healthcare settings specially the non governorate sector.

What are the challenges facing Egypt in general? There is limited commitment. It is such a big country, so many patients, and there wasn't a very clear strategy in the past. There are lots of different sectors, the biggest of which is health and agriculture, and there isn't much of cooperation at this stage. Public awareness is limited. We are not really sure and again like my colleagues were saying if a doctor doesn't prescribe antibiotics, then they are not a good doctor, and some patients don't even bother to go to doctors, they can just go to the pharmacy and pick up a couple of pills and antibiotics, not even a whole course of antibiotics. There is shortage of the facility, so microbiology, lab testing, and of course the overall surveillance.

Some of the healthcare providers themselves aren't aware of how big the problem is and they need to have that kind of training, and we need solid written guidelines for this SOPs, and we also have to take care of the bigger picture which is the whole infection control issue. There is a massive problem again in the Ministry of Health that is actually going to be centered in Egypt but surveying all of Africa on infection control.

National Plan to combat AMR

Focus area 1: Multisectoral coordination and commitment

- Strengthen commitment from all sectors to the comprehensive plan on antibiotics resistance.

National Plan to combat AMR

Focus area 2: Surveillance and laboratories capacities

- Strengthen capacity of microbiology laboratories for rapid and reliable diagnostic testing.
- Establish and maintain antibiotics resistance surveillance systems.
- Establish and maintain appropriate systems to monitor antibiotics use.

National Plan to combat AMR

Focus area 3: Prudent antibiotics use in humans

- 3.1 Promote optimal antibiotics prescribing and use in clinical practice.
- 3.2 Enforce prescription-only use of antibiotics.

National Plan to combat AMR

Focus area 4: Infection prevention and control

- Strengthen infection control practices and processes in hospitals.

Focus area 5: Research

- Facilitate basic research on antibiotics resistance.

Our plan in the Ministry of Health is a five-point plan. The first one is to strengthen multisecretarial coordination between the various stakeholders in the country. The second one is to make sure that the surveillance and the labs are there and like I said, there is going to be this online system that is going to be gathering and pooling data from all over the country. The third point is to regulate the use of antibiotics in humans. It is a massive challenge because it is not easy to change people's psyche and culture. A lot of stakeholders are involved. It is not just a matter of governmental policy, there are also, for example, the pharmaceutical companies that are making a lot of money by being able to sell these Over the counters, so we have to consider that if we

are going to start regulating things. Enforcing a prescription only thing is actually the ideal goal, but perhaps we might be able to find steps that are a little bit closer to that and a little bit more realistic.

The last two points are to get better infection control in all hospitals and basic research either in combating disease by trying to find new antibiotics or anything that really will help infection control.

Hospital Background

- Cairo University Specialised Pediatric Hospital
- Beds: 376
- Specialties:
  - Surgery
  - Pediatrics
  - Emergency Medicine
  - Intensive Care
- Doctors: 260
- Nurses: 475
- Co-medical personnel: 780

CUSPH

Next is my hospital, the Cairo University specialized pediatric hospital. It is a 376 bed hospital that has also an additional 120 intensive care beds divided in three intensive care units and the neonatal surgical intensive care units. We have got four intensive care units in the hospital. We serve over 450,000 children per year with – from my perspective obviously as a surgeon we do 14,000 surgeries per year in all the surgical specialties, so I represent general surgery, but we also have the cardiothoracic surgery, we have got neurosurgery, and we have got orthopedic and neurology as well.

Infection Control Committee

- Members:
  - Doctors (3)
  - Nurses (3)
  - Microbiologist (1)
  - Pharmacist (1)
- IC Nurses: 2
  - Monitor IC policies
  - Liaise between wards/ IC Us/IC committee
  - Provide training
- Infection Control Manual (In Arabic)
  - IC and Antibiotic Stewardship
- IC training
  - For everyone except Administrators and Pharmacists
  - By Microbiology team + IC nurse specialists

We have 260 full-time doctors and just under 500 nurses complemented with just under 800 medical personnel. We have an infection control committee, comprising – actually this is the team, the committee is a larger university level committee, so the team is three doctors, three nurses, a microbiologist, and a pharmacist. Of the two nurses, we have two dedicated infection control nurses and their role is mainly to monitor the infection control policies in the hospital and liaising between the ward and the different incentive cares and the team and to provide training for any of the staff. We have an infection control manual written in Arabic, obviously it is more accessible for a lot of the nurses. The doctors speak fluent English because of their training in medicine, but a lot of the nurses don't speak English.

Within the infection control, we have the antibiotic stewardship program, of which I represent the surgical specialties. The training role of infection control team is basically for everybody except the administrative staff and the pharmaceutical staff, and it is done by the microbiology department and the specialized infection control nurse.

Gram negative organisms
Blood culture
All ICUs
1st January - 30 June 2015.

	Klebsiella (87)	Pseudomonas (61)	Acinetobacter (27)
Augmentin			
Cefoxitin			
Ceftazidime			
Ceftriaxone			
Cefotaxime			
Cefepime			
Imipenem	13 (15%)	9 (15%)	3 (11%)
Meropenem	13 (15%)	9 (15%)	3 (11%)
Cefoperazone/sulbctam			
Pip/ tazobactam			
Gentamycin	12 (14%)	30 (49%)	8 (30%)
Amikacin	13 (15%)	9 (15%)	3 (11%)
Ciprofolxacin	6 (7%)	24 (39%)	8 (30%)
Sulfa-trimethop.			
Polymyxin B			

AMR Situation at CUSPH

The issue in our hospital in terms of antimicrobial resistance can be gleamed a little bit by the antibiograms that the microbiology department presents to us twice a year, for example, if we look at the gram negative organisms in blood cultures in all the intensive care units, for example, we will find that the ones that are highlighted in yellow, are the ones for example, for Pseudomonas. The higher sensitivity is only 49% for gentamicin and 39% for ciprofloxacin. So, that is really bad.

Gram positive organisms
Blood culture
All ICUs
1st January - 30 June 2015.

	CONS (196)	MRSA (27)	Candida (29)
Fox			
Vancomycin			
Clindamycin	84 (43%)	12 (44%)	
Doxycycline	87 (44%)	4 (15%)	
Ciprofloxacin	66 (34%)	5 (19%)	
Amikacin	70 (36%)	5 (19%)	
Gentamycin	29 (15%)	1 (4%)	
Sulfa-trimethop.	6 (3%)		
GN 200			
erythromycin	14 (7%)	1 (4%)	
Teicoplanin	32 (16%)	1 (4%)	

This is from January to June. This was the first half of the year last year, same timeframe but gram positive organisms. Again, we find that the sensitivity of the antibiotics – the organisms to the antibiotics is also quite low. It doesn't really change much in the second part of the year, so again gram negative organisms and blood culture. The best are highlighted in yellow. Again very low number of sensitivities, and the same thing for – sorry this is a mistake in the title, it is gram positive organisms. I had a lot more data but due to time constraints, we can – the microbiology department breaks it down by ICU and by other sources as well, I just chose the blood culture as an example, but we have got wound swabs, etc.

Gram negative organisms
Blood culture
All ICUs
1st July - 31 December 2015.

	Klebsiella (108)	Pseudomonas (38)	Acenito (30)
Augmentin			
Cefoxitin			
Ceftazidime			
Ceftriaxone			
Cefotaxime			
Cefepime			
Imipenem	22 (20%)	13 (34%)	11 (37%)
Meropenem	19 (18%)	11 (29%)	7 (23%)
Cefoperazone/sulbctam			
Piprac/ tazobactam TZP			
Gentamycin	33 (13%)	7 (18%)	11 (37%)
Amikacin	26 (24%)	12 (31%)	9 (30%)
Ciprofolxacin	26 (24%)	13 (34%)	8 (27%)
Sulfa-trimethop.			

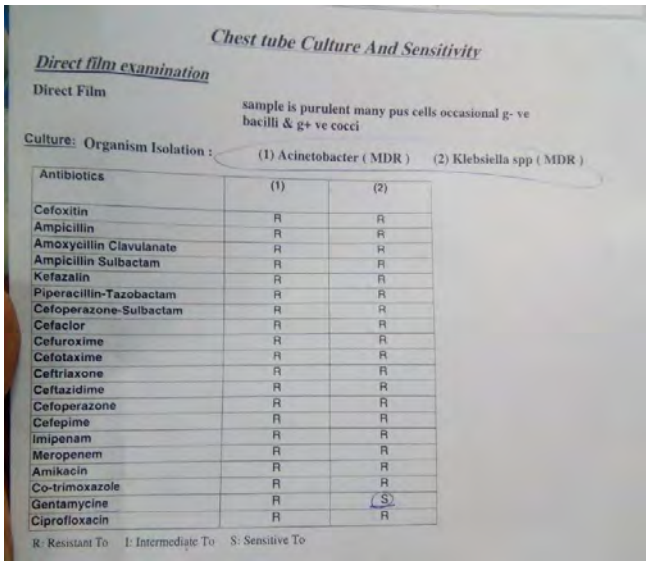
Gram positive organisms
Blood culture
All ICUs
1st July - 31 December 2015.

	CONS (208)	Staph aureus (49)
Vancomycin	208 (100%)	48 (98%)
Clindamycin	96 (46%)	20 (41%)
Doxycycline	72 (35%)	15 (31%)
Ciprofloxacin	72 (35%)	8 (16%)
Amikacin	104 (50%)	16 (33%)
Gentamycin	28 (13%)	3 (6%)
Sulfa-trimethop.		
GN 200		
erythromycin		
Teicoplanin		

Most common organisms
Klebsiella (6): 43%
Pseudomonas (3) 21%
Acinetobacter (2): 14%
Staph aureus (2): 14%

Most common organisms
Pseudomonas (7): 30%
Klebsiella(6) 26%
Acinetobacter= E.coli (2): 9%
Staph aureus (2): 9%

Throughout 2015, the most common organisms throughout the hospital either in the first half of the year, which is the top bit or the second half of the year is pretty much what we see; here we have got Klebsiella pseudomonas, Acinetobacter titer which is what we have been hearing really from everybody, so I think we share a common problem.



Chest tube Culture And Sensitivity

Direct film examination

Direct Film

sample is purulent many pus cells occasional g- ve bacilli & g+ ve cocci

Culture: Organism Isolation : (1) Acinetobacter (MDR) (2) Klebsiella spp (MDR)

Antibiotics	(1)	(2)
Cefoxitin	R	R
Ampicillin	R	R
Amoxycillin Clavulanate	R	R
Ampicillin Sulbactam	R	R
Kefazalin	R	R
Piperacillin-Tazobactam	R	R
Cefoperazone-Sulbactam	R	R
Cefaclor	R	R
Cefuroxime	R	R
Cefotaxime	R	R
Ceftriaxone	R	R
Ceftazidime	R	R
Cefoperazone	R	R
Cefepime	R	R
Imipenam	R	R
Meropenem	R	R
Amikacin	R	R
Co-trimoxazole	R	R
Gentamycine	R	S
Ciprofloxacin	R	R

R: Resistant To I: Intermediate To S: Sensitive To

I put this for laughs and for cries as well. This is almost a typical result we have from a swab of one of the patients, and actually this is one of the good ones where you have a tiny little S at the bottom there and we are like, yes, we found an antibiotic which you can use, but very often it is all R, R, R, R and it is resistant and it is really quite depressive. Coming from a specialty where I am working with children, a lot of the time we have drugs such as colistin that aren't even licensed for use in children besides being toxic and generally they are not licensed for use in children. We have to use them, and even more specifically, I am working with neonates, and some of them are preterm. We are using them and we don't really know what we are doing to these children, so it is quite a huge problem.

Outbreak?
SNICU SSI Audit

- This audit was conducted over one week
- from 28/5/2016 to 4/6/2016

- Collected data taken from all SNICU patients:
- Surgery (site,date,place,and surgeon)
- Already prescribed antibiotics, either continued or changed
- Is there wound infection or not? According to "Global Surg" criteria.
- Wound swab for infected wounds and C&S results

- Results:
  - Of 15 postoperative patients,10 cases had SSI (66%)
  - 6 of these 10 patients had wound dehiscence (60%)
  - 7 of these 10 patients had Klebsiella on their wound swab results (70%)
  - 3 of these 10 patients showed MDR on their sensitivity results (30%)

To highlight one of these things and again from my surgical perspective, we had a huge number of wound infections all of a sudden. Wound infections in general, SSI on my neonatal surgical unit are a problem, but they were never a problem like this week that we had, so we decided to just audit and see what we were doing, and so over – just under a week's period, we just collected data to try and find out what the problem was. We put a very clear criteria for defining a wound infection, and if you have heard of the global surge projects have been happening for the past few years.

Their latest project that is being analyzed now was on actually surgical site infection, so they had a very clear and nice bulleted definition what a surgical site infection was, so we went and did this audit and we found that 15 neonates, 10 of them had a wound infection, if they didn't have it at the beginning of the audit, by the time we finished auditing, they developed a wound infection, and so 60%. Seven of these were Klebsiella. Now we wanted to know whether this was an outbreak or not, but the results from the microbiology lab were equivocal, so they couldn't tell us whether this was the exact same strain or not, but clearly there was

a problem. Around 30% of these 10 patients had multidrug resistant organisms, they were multidrug resistant.

- 8 patients were operated in majors (53%)
  - 5 developed wound infection (62.5%)
  - 2 with infection died (40%)
- 7 patients were operated in the ER (46%)
  - 7 developed wound infection (100%)
  - 1 died (14%)

We have lots of data analyzing this audit again. It is just one of the things that were looking at, was it for example, a theater-related issue. We found that there wasn't really any major difference between whether they were operated in one theater or whether they were operated in the emergency department.

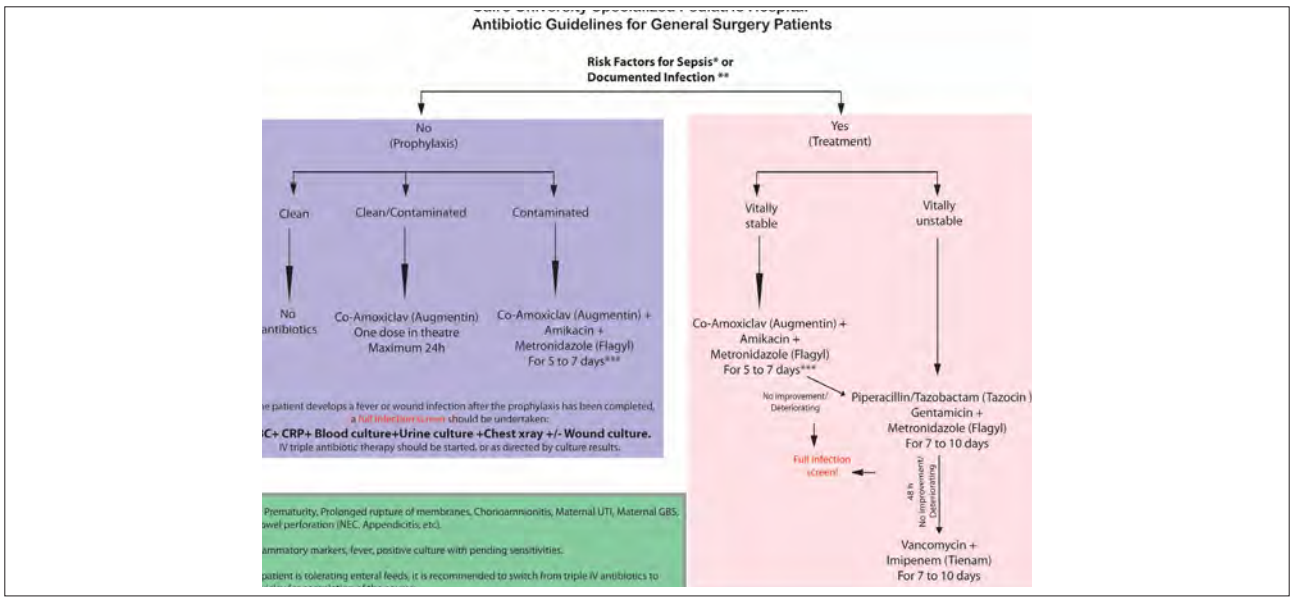
Strategy of Control

- Surveillance system
  - Twice yearly antibiograms
  - Twice yearly ICC at University Level
  - Monthly reports on SSIs
- Yes, but…

We need to control this, it is more of an awakening. We realize if there is a problem and one of the first steps to solve a problem is to actually acknowledge that you have a problem. We have our surveillance system. We have our antibiograms happen twice a year to tell us what the magnitude of the MDR or the AMR is. Our control team meets with the infection control committee at the university level twice a year. We have monthly reports on surgical site infections and are saying yes, but again like one of my colleagues was saying, it is an issue of data collection. We have some data collection in the hospital, but we don't have a very robust way of collecting all the data, and my colleague from China was saying it is really the IT that is going to be able to help us make these decisions, if we pool everything into a good centralized IT system.

- Awareness campaigns by ICC
- Antibiotic Stewardship program
- Antibiotic Protocol for General Surgery (October 2016)
- Repeated audits on SNICU
  - SSI
  - Antibiotic usage/protocol

We have awareness campaigns by infection control committee. Like I said, there is an antibiotic stewardship program, and we worked really hard over the summer to bring out some guidelines, and I was in charge of the surgical guidelines and I will show them to you in the next slide. This protocol was rolled out just in October last year. We have a research candidate who is on my unit on the neonatal intensive care unit who is monitoring, so we did pre-antibiotic protocol audit to see what the antibiotic usage was and for how long it was used, and post implementation of the new protocol, we were going to correlate this of course with infections. Naturally, we need to do repeated audits for surgical site infection and the usage protocol.



This is the flowchart for both our prophylactic guidelines and our treatment guidelines for the surgical babies. It applies to all of the – we wanted to keep it simple, so it applies to all the ages of pediatric surgery. The only difference is when it comes to neonatal surgery, I don't know if you can see the small print there, it is probably in your hand out where it says that we can switch to oral antibiotics, we don't switch to oral antibiotics in neonates, we just keep them on IV antibiotics. Thank you very much.

VI

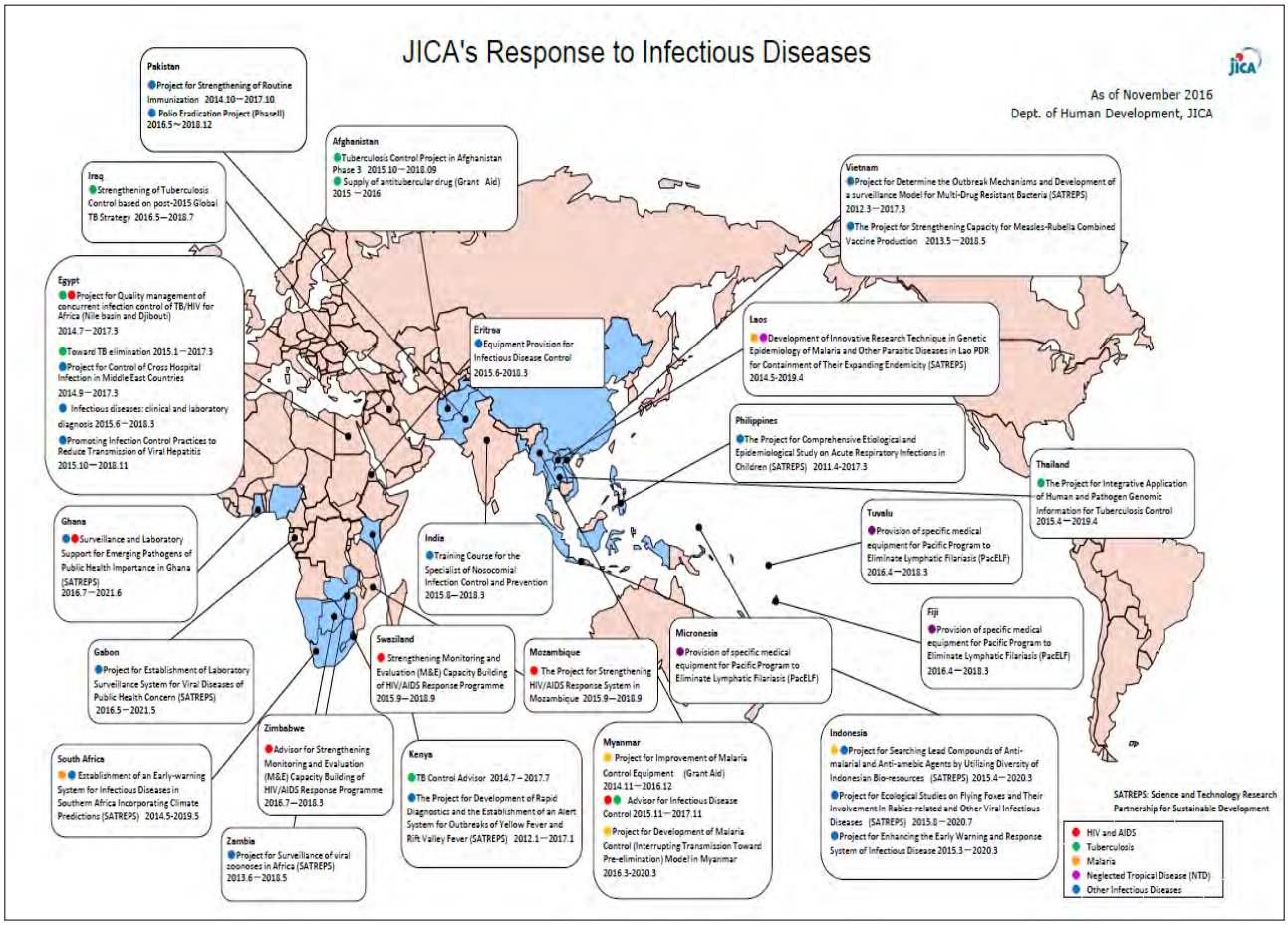
JICA's Efforts on Responding to AMR

Sangnim Lee, R.N., MPH

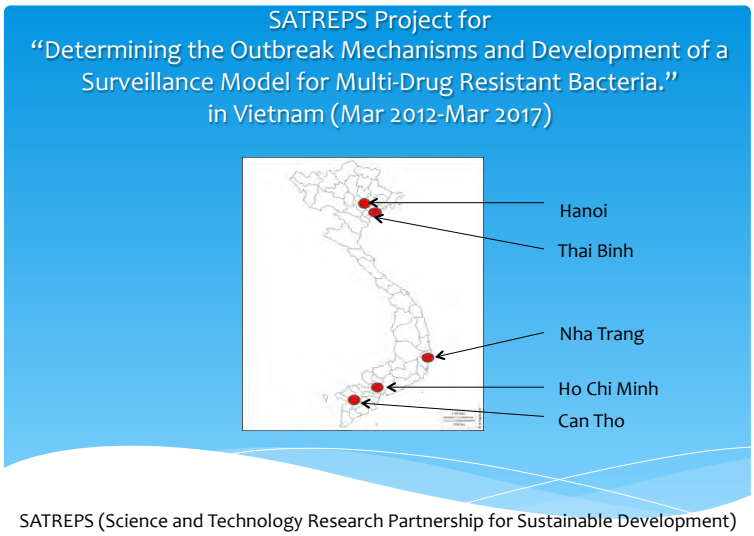
Health Advisor, Health Group 2, Human Development Department,
Japan International Cooperation Agency (JICA)

Dr. Omagari: I am inviting our sixth speaker from JICA, Ms. Lee from the JICA Human Development Department, and she will talk about a big project produced by JICA.

Ms. Lee (JICA): Thank you very much for your kind introduction Dr. Omagari. Today, I am going to give a presentation about JICA's efforts on responding to AMR.

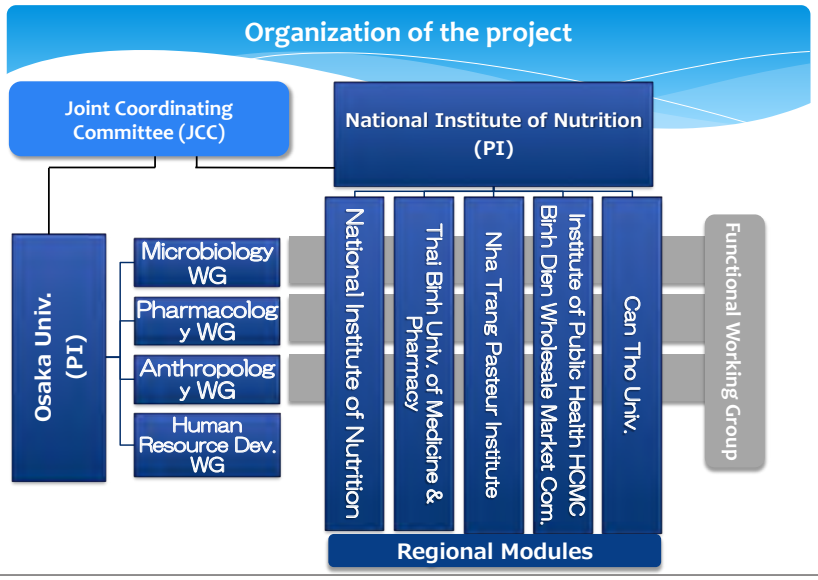


This slide shows the world map snapshot of JICA's ongoing projects for infectious disease control. A number of projects are conducted in the world, but my presentation is about a project in Vietnam. All participants and special participants from Vietnam, nice to meet you all.



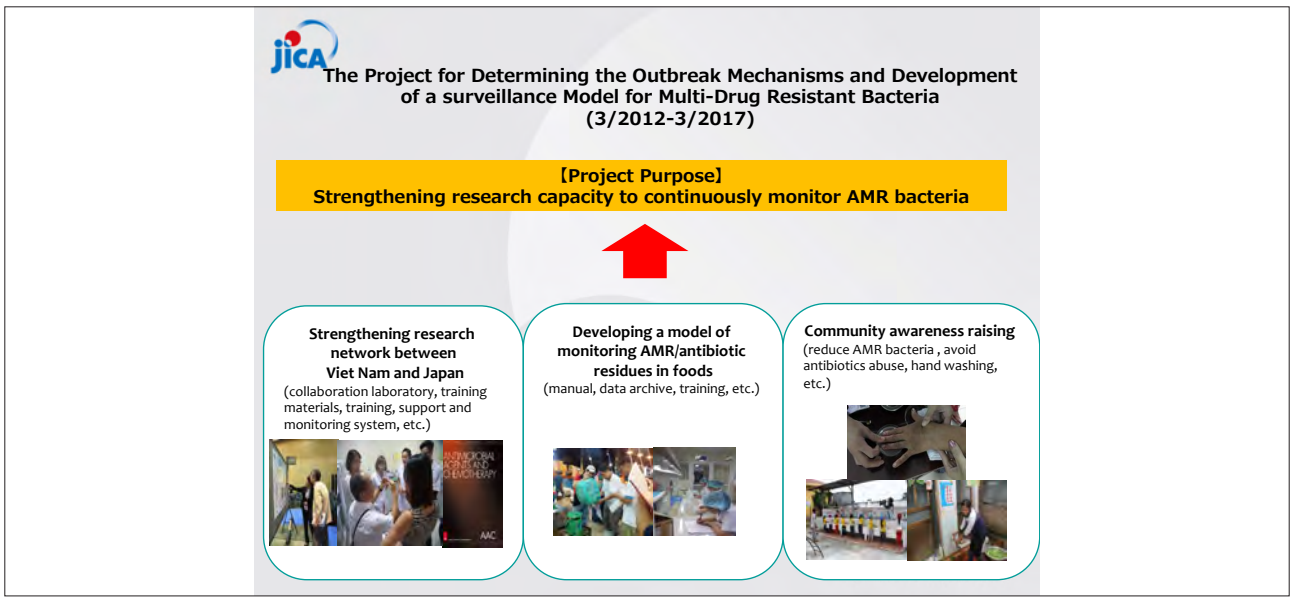
SATREPS (Science and Technology Research Partnership for Sustainable Development) is a collaboration scheme between JICA and AMED/JST.

This project is called Determining the Outbreak Mechanisms and Development of a Surveillance Model for Multi-Drug Resistant Bacteria. This is a five-year project, and it has been implemented under the collaboration scheme `SATREPS' between JICA and Japanese agency called AMED to promote international joint research.

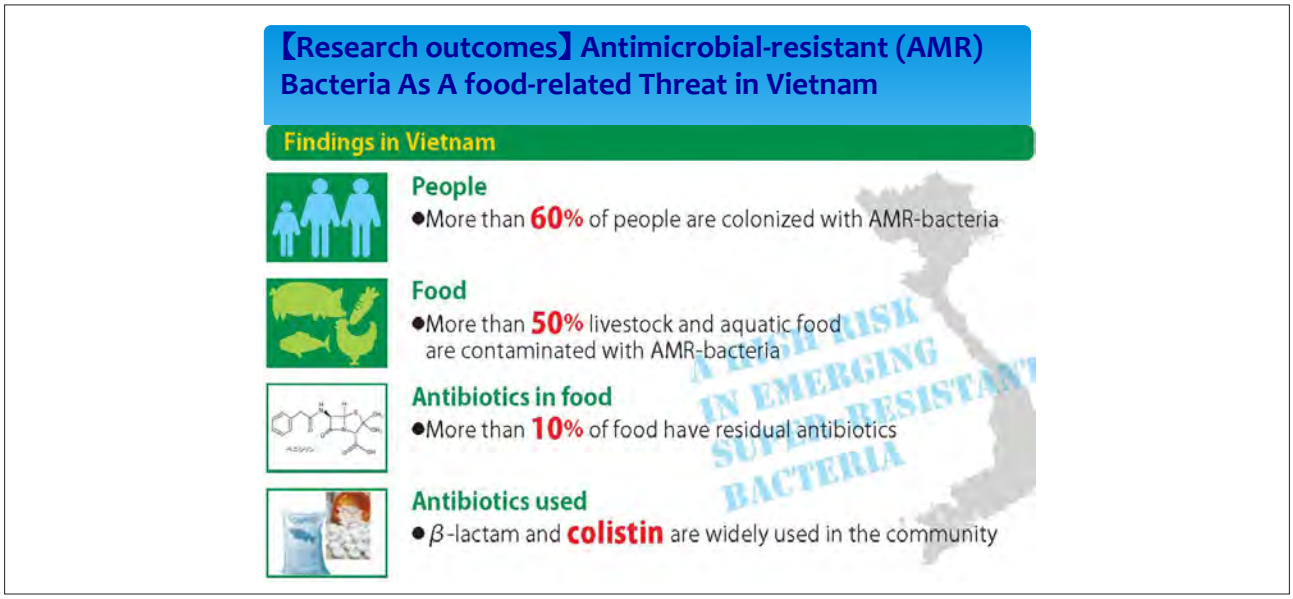


This is an organization chart of the project, there are project partners from Vietnam and Japan. From Vietnamese side, there are five institutes and universities, and one wholesale market from the private sector. These are from Hanoi, Thai Binh, Ho Chi Minh, Nha Trang and Can Tho. From the Japanese side, there are four universities and one institute involved in this project, and the principal institute of Japanese side is Osaka University. Actually I wanted – Professor Yamamoto, the head of this research team of Osaka University, to give a presentation to all of you today, but unfortunately he works in Osaka today. So, that is why I am presenting in this way.

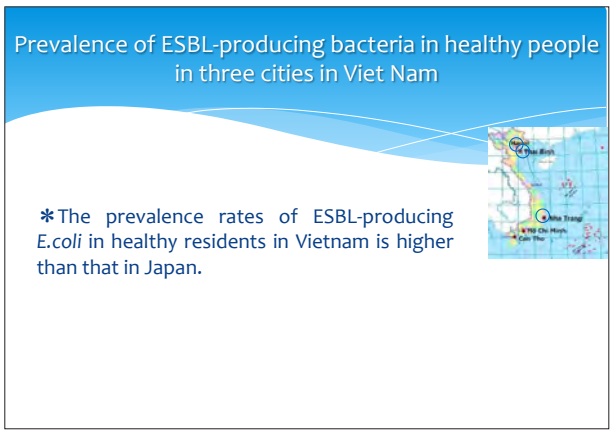
The Vietnamese team is led by the National Institute of Nutrition based in Hanoi.



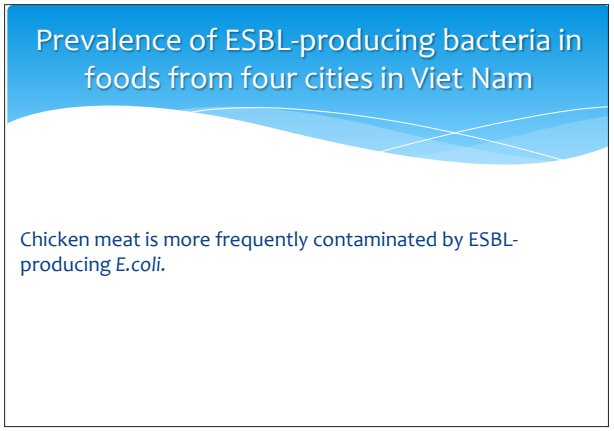
This project aims to strengthen research capacity to continuously monitor AMR bacteria by three main components. The first one is strengthening the research network between Vietnam and Japan. The second one is developing a model of monitoring AMR and antibiotic residues in foods. The third one is community awareness raising. It is a community intervention program.



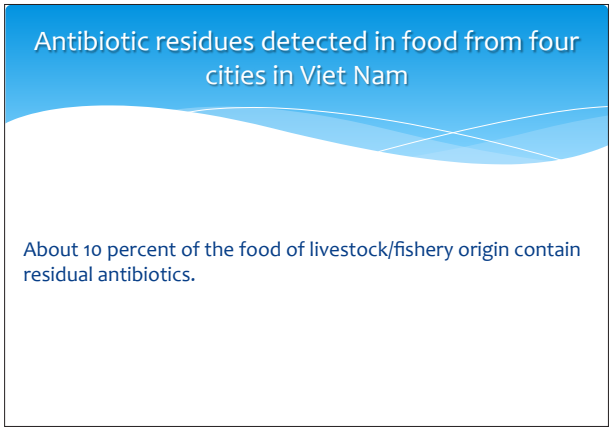
These are research outcomes. First, more than 60% of residents investigated are colonized with AMR. It is named ESBL-producing bacteria that is a target AMR bacteria. Second, more than 50% of livestock and aquatic food investigated are contaminated with AMR bacteria (ESBL-producing bacteria). Third, residual antibiotics were found in more than 10% of food investigated in Vietnam. Forth, β -lactam and colistin are widely used in the community.



The prevalence of ESBL-producing bacteria in healthy people investigated in three sites in Vietnam was higher than that in Japan. The Vietnamese sites include Hanoi, Thai Binh and Nha Trang.



I am mentioning the prevalence of ESBL-producing bacteria in foods from four cities in Vietnam. Target food are pork, chicken, fish, and shrimp. Chicken meat is more frequently contaminated by ESBL producing E. coli.



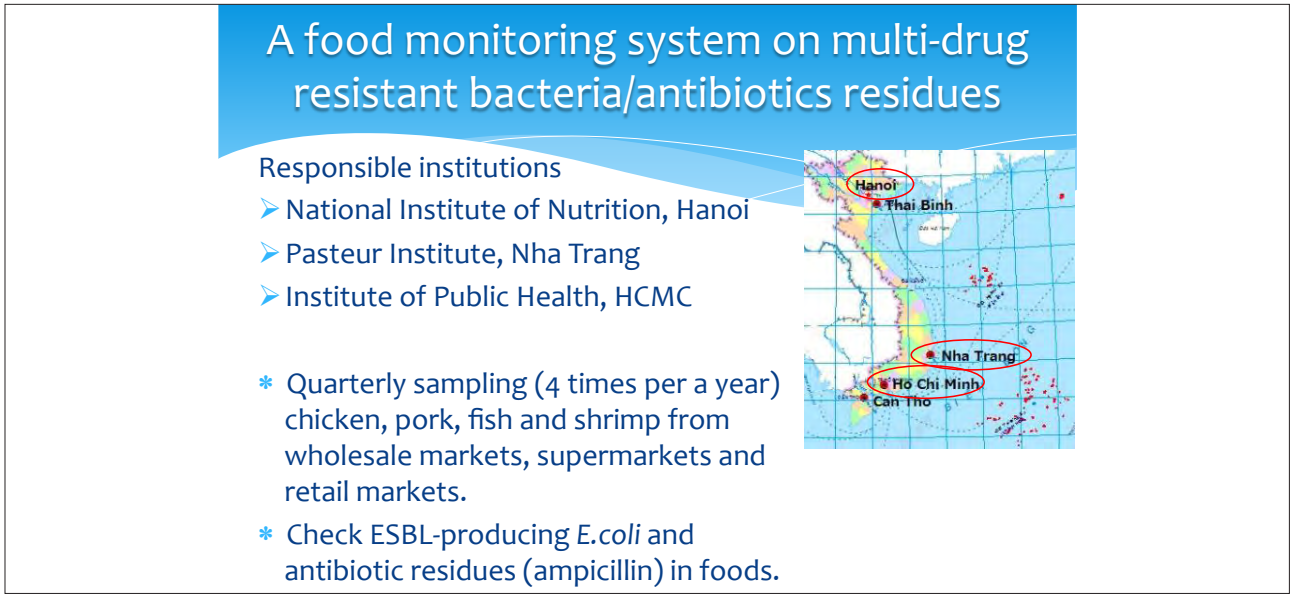
Regarding antibiotic residues detected in food investigated from four cities in Vietnam, about 10% of the investigated food of livestock/fishery origin contained residual antibiotics. Food are already supplied in the market, but still residual antibiotics are identified by this research. Antibiotic residues becomes selective pressure of AMR. That is very important point.

The next slide shows the antibiotics supply for chicken at the rural veterinary drug store in the local community system. More than half of frequency is the combination of antibiotics and more than half of supply includes colistin. The use of colistin seems very easy at community level although colistin is very essential antibiotics. It is known that the use of colistin is a great risk for the super bug, so colistin resistance is affected to human health.

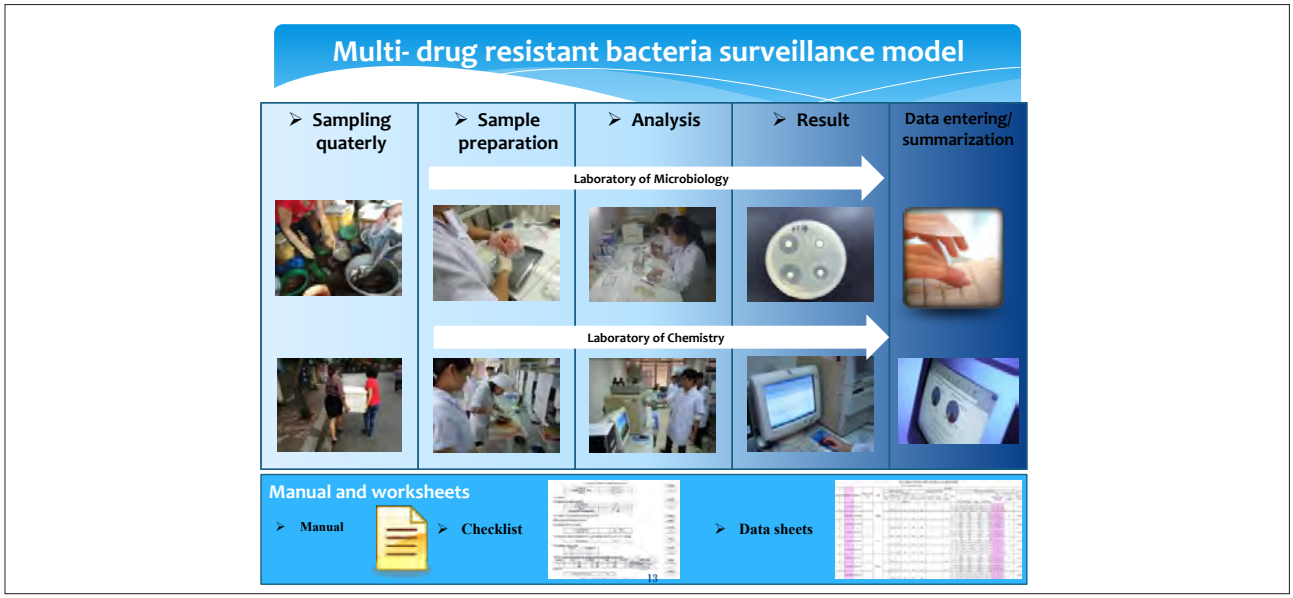
Both the project's community intervention and these important evidences suggest that the importance of understanding food chain in relationship with healthy people with AMR; the food chain from production level up to dining table consumers at home level, and how livestock and fishes contain antibiotics in local community.

In this summer, I visited one project site and walked in the field. And then I found a big feedstuff for pork which contains colistin 7%. It seems very common of containing colistin in these feedstuff for animals. This project team collected sample from food in Wholesale market and local markets. This study helps to understand why AMR is identified for

Healthy people; such as relation that how people wash hand properly or how to touch raw meat with AMR or bacteria and how to cook foods. I want to give more information later.



Next, I am explaining about the developed food monitoring system on multidrug resistant bacteria and antibiotic residues by this project. The surveillance system of ESBL producing E. coli and antibiotic residues, ampicillin, in food has been established together with National Institute of Nutrition, Pasteur Institute of Nha Trang and Institute of Public Health, Ho Chi Minh city as a model system. System is ready to expand a full-scale system.

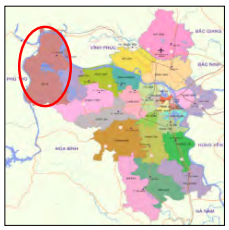


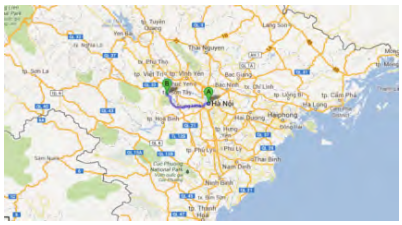
Projects develop a monitoring system and also developed monitoring manual. The project team summarized in the manual about how to sample, how often, and how to prepare samples, how to analyze, how to assess the data.

Public health intervention to reduce risk factors of outbreak and spread of antibiotic resistant bacteria in the community

Study site: Trai hamlet, Chu Minh comm., Ba Vi Dist., Hanoi

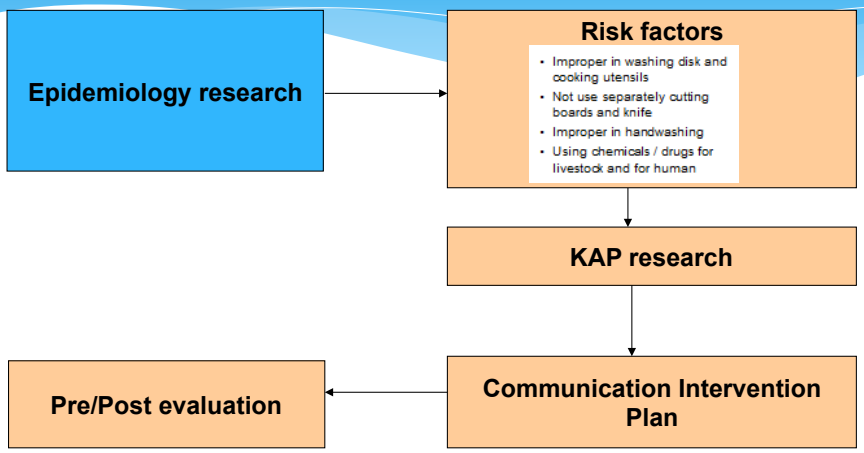
* Population Bavi district: 265,000; Chu Minh commune: 7,918; Trai Hamlet: 1,000 people
* Targeted population: 52 households
* 1 commune health station
* Period of intervention: Seven months, Aug. 2015 – Mar. 2016





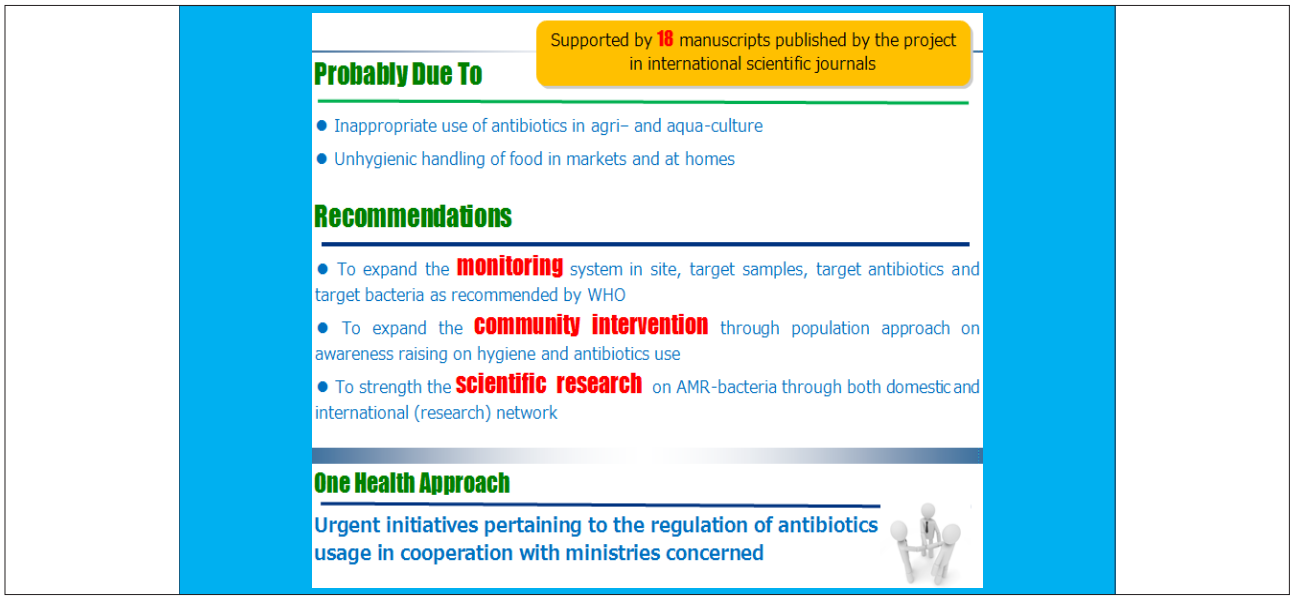
This slide shows the public intervention to reduce risk factors of outbreak and spread of antibiotic resistant bacteria in the community. The target area is Bavi district in Hanoi. The period of intervention was for seven months, because our project team firstly conducted epidemiological macrobiotics and pharmacological study and then they moved to this kind of community intervention.

Intervention research protocol



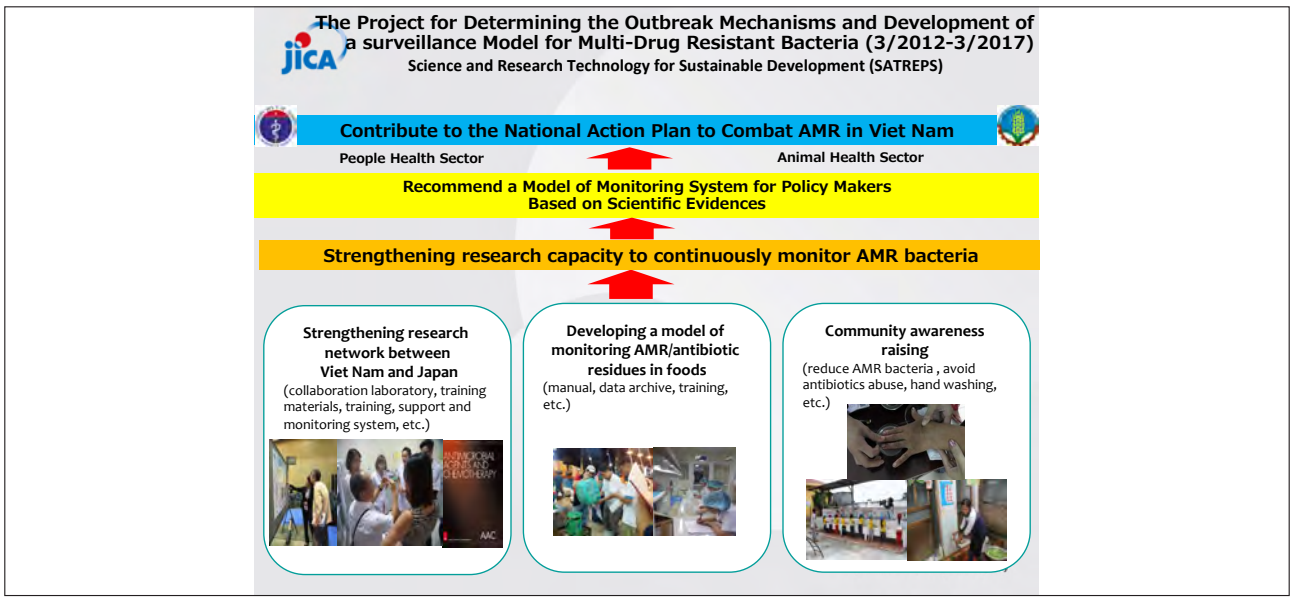
This is intervention research protocol based on epidemiological research. This community intervention identifies the risk factors of community, such as washing dish inappropriately and cooking utensils, not using cutting board and knife separately, improper handwashing, and using chemicals/drugs for livestock and for human. In community, it seems that people easily get antibiotics without prescription at drugstores.

This team conducted KAP research and then community intervention, and evaluated before and after the interventions. The slide shows the photos of community intervention for raising community awareness through direct communication, promotion of the proper hygiene practice by utilizing outdoor and indoor posters. Project team also demonstrated a right hand washing practice. For school pupils, they conducted contest about knowledge of antibiotic resistant bacteria and how to wash hands properly. Public speaker systems in community were also utilized.



■ Recommendations from the project to government of Vietnam to fight with AMR

This is the recommendation from the project to the government of Vietnam to fight with AMR. The wide spread of AMR as what I already explained based on several researches is probably due to inappropriate use of antibiotics in agri- and aqua-culture and due to unhygienic handling of food in markets and homes. Recommendations are to expand the monitoring system, to expand community interventions, and also to strengthen scientific research. These strongly suggest that `One Health approach' is necessary in Vietnam, especially urgent initiatives pertaining to the regulations of antibiotics usage in cooperation with ministries concerned. It is not only matter of Ministry of Health, it is also the matter of Ministry of Agriculture and Rural Developments, Ministry of Industries. It is intersectional issue. We consider the relationship among human health, animal health, food safety and environment. All these factors need to be considered to respond to AMR.



At the beginning of my presentation, I mentioned that the project purpose is strengthening research capacity to continuously monitor AMR bacteria. However, now this project can recommend the model of monitoring system for policymakers of Vietnam based on very important scientific evidences. Also, we are sure that these research findings can contribute to the National Action Plan to combat AMR in Vietnam.

The significant research findings could be utilized in these policy development. The project members have had discussions with Ministries. So, that is all of my presentation. Thank you for your attention.

Q & A

Dr. Omagari: Thank you for your presentation. Do you have any comments or questions to this presentation?

Our colleagues from Bangladesh and Bhutan, if possible, would you like to make a comment for this symposium?

Dr. Anjuman (Bangladesh): First, it was our luck that we got an opportunity to come here. We would like to thank you and JICA for allowing us to come here and gather so much knowledge about infection prevention and about AMR bacteria, which is so useful and timely symposium. I am grateful to you all.

Dr. Omagari: Thank you. I would like to thank you all – all the participants and also speakers for participating in this symposium. Actually, I have learned a lot myself about the situation of the AMR in each country. We all know that the issue of the AMR is global. However, the issue of AMR is at the same time based on the context for each countries, we have different issues, different problem, so we have to tackle them. Now we know that we have so many common issues like crowdedness of the hospital, lack of surveillance. And we need a capacity building microbiology and laboratory, there are common issues. But I have learned a lot of promising project or promising thoughts from this symposium. Everybody was stressing the importance of changing the awareness, especially the community that is quite important. They also mentioned about the contribution of safety culture toward implementation of the infection prevention control. I was actually surprised that so many of us – so many of you are talking about the introduction of the IT system, information technology to combat AMR. I personally will think about it in terms of how we can do introduce IT combat the AMR issue. I would like to close this symposium. Thank you very much.

Jun Moriyama: Thank you very much Dr. Omagari. We would like to close this session. Thank you all for your corporation.

Program for the Specialist of Healthcare-Associated Infection Control and Prevention
Knowledge Co-Creation Session "Sharing Experiences of Antimicrobial Resistance (AMR)"

National Action Plan on Antimicrobial Resistance in Japan

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Tuberculosis and Infectious Diseases Control Division, Health Service Bureau,
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The Actions of China in Containing Antimicrobial Resistance

Weiguo Zhu M.D.,CPHIMS
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Deputy Director, Department of Information Management General Internal Medicine,
Peking Union Medical College Hospital

AMR Situation in Vietnam

Dr. Truong Thien Phu
Head of Microbiology Department, Cho Ray Hospital
Dr. Nguyen Phuc Tien
The Department of Microbiology of Cho Ray Hospital

Anti-Microbial Resistance in India

Dr. Thandavarayan Murali
Senior Assistant Professor, Pediatric Emergency Department
Institute of Child health and Hospital for Children
Dr. Thirumalaikumarasamy Sivaraman
Senior Assistant Professor, Pediatric Intensive Care
Institute of Child health and Hospital for Children

Anti-Microbial Resistance Situation in Egypt

Dr. Yasser Kandeel
Head of Infection Control Department, Egyptian Ministry of Health and Population
Dr. Aly Shalaby
Lecturer and Clinical Lead for the SNICU / Pediatric Surgery Department
Cairo University Specialized Pediatric Hospital

JICA's Efforts on Responding to AMR

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