NAP on AMR: Singapore

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NATIONAL STRATEGIC ACTION PLAN ON AMR

5 Core Strategies in line with the Global Action Plan

- Education
- Surveillance & Risk Assessment
- Research
- Prevention & Control of Infection
- Optimisation of Antimicrobial Use

Aim of National Plan:
To reduce the emergence and prevent the spread of drug-resistant organisms

Global Plan objective:
To ensure, for as long as possible, continuity of the ability to treat and prevent infectious diseases

| Agri-Food & Veterinary Authority (AVA) | Ministry of Health (MOH) | National Environment Agency (NEA) | PUB, Singapore’s National Water Agency |
**One Health**

- Coordinate national strategy for improving awareness and understanding of AMR
- Reinforce food safety and hygiene practices

<table>
<thead>
<tr>
<th>Public</th>
<th>Professionals</th>
<th>Industry</th>
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</table>
| Activities organized to commemorate World Antibiotic Awareness Week  
Social hygiene and vaccination promotion campaigns | AMR included in education curricula of veterinary tertiary colleges recognised by Singapore  
Regular activities to raise AMR awareness to vets & farmers | Schemes to encourage good animal husbandry practices and biosecurity |
| AMR awareness campaigns | Continuing education and new postgraduate training programmes for healthcare and veterinary professionals  
Increase awareness among veterinary sector stakeholders | Messages on proper waste disposal in national campaigns  
Education efforts to promote prudent use of antimicrobials in animals and emphasize infection control |

**Ongoing**

- AMR awareness campaigns

**Priority areas for further action**

- Increase awareness among veterinary sector stakeholders

- Education efforts to promote prudent use of antimicrobials in animals and emphasize infection control
### One Health

- Integrate surveillance for AMR and antimicrobial utilization across sectors
- Establish a national coordinating body
- Publication and reporting

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<th>Human</th>
<th>Animal</th>
<th>Food</th>
<th>Environment</th>
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| AMR surveillance and antimicrobial utilization in hospitals  
All public hospital labs and NPHL have AMR detection capability | Antimicrobial sales and utilization is monitored  
Major livestock pathogens of public health significance are monitored, and AMR profiles are determined | Food products routinely tested for antibiotic residues, foodborne pathogens especially resistant types | Baseline surveys are ongoing |
| Harmonise lab methods and data reporting  
Establish national AMR reference laboratory  
Extend surveillance to private hospitals and community | Expand AMR surveillance to include all animal production sectors  
Harmonise AMR surveillance with antimicrobial utilization on farms | Enhance laboratory capacity for testing in food products  
Strengthen surveillance in food products, to include retail food and meat, and assess risk to consumers | Develop a systemic environmental surveillance system  
Conduct risk assessment to guide follow-up actions e.g. policy and operations |
WAAW!
It's the
World Antibiotic Awareness Week
FREE TOTE BAG

Marine Parade Public Library | 25-26 Nov | 10am-4pm

Learn more about GERMS & ANTIBIOTIC RESISTANCE

BE A GERM BUSTER

- Learn all about antibiotics
- Peak at bacteria under the microscope
- Stop germs from spreading
- Wash your hands
- Master ‘tricks’ of handwashing
- Pledge never to treat illness with antibiotics
- Use less, kill fewer germs

Challenges of Global One Health Capacity Building: Antimicrobial Resistance

NUS
National University of Singapore
School of Public Health

Lost in Translation
Antimicrobial Resistance in Companion Animals: What's the big deal?

By Dr. Jason Wu, VMD, MPH, PhD, DACVIM (Infectious Disease), Ohio State University

The availability of antimicrobials has revolutionized veterinary medicine and is critical in preventing and controlling infectious disease in our patients. Unfortunately, the emergence and dissemination of antimicrobial resistance (AMR) threatens this. The importance of AMR in human health is well-recognized, with a similar problem in veterinary medicine only more recently identified. Great attention is being paid to the importance of prudent antimicrobial use and infection control practices in controlling AMR. There is more focus on AMR in companion (small) animal veterinary medicine.

Any antimicrobial use leads to some pressure for resistance development. Widespread or indiscriminate use of antimicrobials results in even greater resistance without the therapeutic benefits. Certain antimicrobial-resistant organisms are of particular concern because of the potential impacts on animal and human health. Additionally, some antimicrobial resistance genes are present on plasmids that can move between bacteria, resulting in further dissemination of resistance. Many of the affected bacteria species are part of the common gastrointestinal flora of people and animals. AMR can have far-reaching effects.

In companion animal veterinary medicine, AMR pathogens are likely to be transmitted from numerous sources including the environment, human contact, and other animals. Transmission among animals and between animals and people is well-described for several AMR pathogens. A number of bacterium species can be isolated in critically important or concerning AMR pathogens affecting companion animal veterinary medicine on a regional or global scale: Staphylococcus, Enterococcus, Escherichia coli, Enterobacter, and Salmonella.

Staphylococcus provides an excellent example of AMR in companion veterinary medicine. Staphylococcus is considered to be a lesser concern compared to other classes of antimicrobials. S. aureus is more resistant to methicillin-resistant Staphylococcus aureus (MRSA), and to a lesser extent, ampicillin-resistant Staphylococcus aureus (MRSS) and methicillin-resistant S. epidermidis (MRSE) respectively when the gene is present.

Methicillin-resistant Staphylococcus aureus (MRSA) can cause resistance to piperacillin, methicillin, and vancomycin. Additionally, resistance to other classes of antimicrobials is frequently observed, including clindamycin, trimethoprim-sulfamethoxazole, chloramphenicol, and quinolones. Factors associated with veterinary MRSA colonization or infection in dogs include prior antimicrobial use after hospitalization, and longer hospitalization (>3 days). The use of quinolones and cephalosporins has been linked to the emergence of MRSA in people and may play a role in veterinary species. MRSA has rapidly spread globally in certain populations and has now become established in several countries. In our study, more than 90% of MRSP isolates were resistant to tetracycline and the third generation of cephalosporins. Therefore, it is suggested no specific transfer may be a factor in MRSP disease. This highlights the importance of prudent antimicrobial use in limited transmission (e.g., cleaning and disinfection). Use of isolation for infected patients.

Continued emergence and dissemination of resistance in MRSP may pose even greater challenges as the limited range of effective drugs further decreases.
**One Health**

- Set up a national coordinating body to coordinate research in line with a national AMR research agenda

### Human
- Funding available through various institutions and funding streams
- E.g. surveillance of healthcare-associated infections in public and private hospitals
- AMR is one of the top 3 infectious disease focus areas for research under the RIE2020 Plan

### Animal
- Industry involved in developing rapid test kits to detect bacterial pathogens and guide appropriate treatment
- Industry developing alternatives to antimicrobials e.g. vaccines, pre-/probiotics
- Establish baseline AMR data for target bacteria in local farms
- Facilitate applied research into development of viable alternatives

### Environment
- Research studies to understand environmental gene reservoirs and association with phenotypic expression
- Prevalence study of drug-resistant organisms in ready-to-eat food samples, crops and meat
- The on-going studies will guide priority area determination
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<td>National immunization policies for children, travelers and healthcare workers</td>
<td>Promote and implement farm biosecurity measures to prevent &amp; control outbreaks</td>
<td>Regulations for good food safety and hygiene to prevent foodborne diseases</td>
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<tr>
<td>Infection control programmes in hospitals</td>
<td>Guidelines for good animal husbandry practices have been established</td>
<td>Regulations for environmental hygiene to prevent waterborne diseases</td>
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<td>NIPC issues National Infection Control Guidelines</td>
<td>Use of vaccines and alternatives to antimicrobials encouraged</td>
<td>Hospitals required to disinfect sewerage before discharge</td>
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<td>Outbreak response and control</td>
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<td>Regulations for proper disposal of pharmaceutical waste (including antibiotics) to minimize risk of acquiring drug-resistant organisms</td>
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<td>Increase uptake of vaccination among adults</td>
<td>Improve animal health management practices in local food animal establishments</td>
<td>Enhance surveillance and programmes for food safety</td>
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<td>Enhance IPC measures in hospitals</td>
<td>Promote and facilitate the use of vaccines and alternatives to antimicrobials</td>
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**Ongoing Priority areas for further action**
SUSTAINABLE AQUACULTURE - A SINGAPORE PERSPECTIVE

TUESDAY 21 NOV 2017 0800-1700HRS
SEMINAR RM D1.110
NAKYANG POLYTECHNIC

FREE REGISTRATION

A PARALLEL PUBLIC ENGAGEMENT EVENT WITH TALKS ON SEAFOOD SAFETY, NUTRITION & CULINARY TIPS WILL TAKE PLACE FROM 0900-1230HRS @ SEMINAR RM D1.111

Expect only the FRESHEST

When you purchase your eggs, you expect quality and freshness. With this logic, you can be assured of buying only the best. Keep a look out for it.

Good Aquaculture Practice FOR FISH FARMING
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<td>Strengthen antimicrobial stewardship in hospitals</td>
<td>Establish a robust regulatory framework for supply chain control of all antimicrobials</td>
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<td>Ensure appropriate antimicrobial use in the community</td>
<td>Strengthen the system to ensure prudent use of antimicrobials in veterinary medicine and reduce inappropriate use of antimicrobials in food-producing animals e.g. guidelines, stewardship programmes, directives</td>
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**Priority areas for further action**

**Ongoing**

- HSA regulates products containing antimicrobial agents
- Antimicrobial stewardship programmes implemented in all public hospitals
- Strengthen antimicrobial stewardship in hospitals
- Ensure appropriate antimicrobial use in the community
- Certain antimicrobials prohibited for use in feed, and all food producing livestock and aquaculture farms
- Non-therapeutic use of antimicrobials, e.g. for growth promotion in absence of risk analysis, is not considered prudent use
- Establish a robust regulatory framework for supply chain control of all antimicrobials
- Strengthen the system to ensure prudent use of antimicrobials in veterinary medicine and reduce inappropriate use of antimicrobials in food-producing animals e.g. guidelines, stewardship programmes, directives
“Recognising the expansive and adverse impact of Antimicrobial Resistance (AMR) in agriculture on public and animal health, livelihoods, food security and safety, we agreed to strengthen regional cooperation in AMR mitigation through:

(i) Raising awareness and advocacy on AMR issues and promote the prudent use of antimicrobials;
(ii) Enhancing capacities on surveillance, diagnosis and research on AMR and antimicrobial usage (AMU);
(iii) Promote good animal husbandry practices and the development of viable alternatives; and
(iv) Enhancing collaboration with relevant sectors and stakeholders including development partners and donor agencies.”
39th AMAF, September 2017, Thailand

- Sustained emphasis on cooperation on AMR in agriculture, and aquaculture

Food Safety and Agricultural Product Quality

“We welcomed the initiative to protect human and animal health from the expansive and adverse impact of antimicrobial resistance (AMR) in agriculture on public and animal health, livelihoods, food security and safety. **We endorsed the ASEAN guidelines on prudent use of antimicrobials in livestock and welcomed Singapore’s initiative on the ASEAN Cooperation Activities for AMR in aquaculture sector**”
ASEAN LEADERS’ DECLARATION ON ANTIMICROBIAL RESISTANCE (AMR): COMBATING AMR THROUGH ONE HEALTH APPROACH

Adopted in Philippines, November 2017

Develop an ASEAN strategic plan to combat AMR with nineteen key priority areas
UPCOMING WORK SHOP IN SINGAPORE

“Surveillance of Antimicrobial Resistance (AMR) through the Whole Genome Sequencing Methods and Conventional Methods”

Singapore from 5-7 Feb 2018, by AVA and Nanyang Technological University Food Technology Centre (NAFTEC)

Member States interested or needing more information, to contact Dr Lee Song Hao (lee_song_hao@ava.gov.sg)

Limited places, self-funding basis (travel & accommodation) Workshop is free
THE END