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New chapter in tackling antimicrobial resistance in Thailand

Nithima Sumpradit and colleagues describe the experience of Thailand in developing its national strategic plan on antimicrobial resistance and highlight the need for sustained political commitment and multisectoral collaboration.

Antimicrobial resistance (AMR) is a serious global health threat which can cross borders and human and animal species. Concerted action is required at global, regional and national levels to tackle it. The World Health Assembly adopted the global action plan on AMR in 2015, which called on member states of the World Health Organization to develop national action plans by May 2017. To date, 67 member states have finalised their national action plans.

AMR places a high burden on health and the economy in Thailand, and the government has shown strong political commitment to tackle AMR over the past decade. Box 1 summarises the effect of AMR and antimicrobial consumption in Thailand.

Earlier initiatives to tackle AMR, summarised in box 2, have shown some success in reducing the inappropriate use of antimicrobials, but progress has been slow. A need was felt to integrate and consolidate actions across different sectors and to monitor progress.

In 2016, the cabinet endorsed the first five year National Strategic Plan on Antimicrobial Resistance in Thailand for 2017 to 2021. The cabinet endorsement gives the plan legal status for implementation in different sectors. The plan is based on the One Health approach and takes account of the key components and strategic objectives of the WHO global action plan on AMR.

### Box 1: Burden and prevalence of antimicrobial resistance in Thailand

<table>
<thead>
<tr>
<th>AMR burden*</th>
<th>Box 2: Initiatives on AMR in Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>• About 88000 infections were attributed to antimicrobial resistance (AMR), resulting in at least 3.24 million additional days in hospital and 38000 deaths</td>
<td>• National AMR Surveillance Centre was established in 1998 at the Ministry of Public Health and has been a WHO Collaborating Centre for AMR Surveillance for the South-East Asia region since 2005</td>
</tr>
<tr>
<td>• Direct costs of antibiotics to treat AMR infection were about $70-$170m (£54-£132m; €62-€150m; 2400-5800m baht)</td>
<td>• The nosocomial infection control programme was started in 1971</td>
</tr>
<tr>
<td>• Indirect costs of morbidity and premature deaths related to AMR were at least $1100m</td>
<td>• Antibiotics Smart Use Program was started in 2007; it aims to reduce unnecessary prescriptions of antibiotics for common self-limiting conditions, including upper respiratory tract infections, acute diarrhoea, and simple wounds. Hospitals that achieve the approved standards for appropriate use of antibiotics for these conditions will receive financial rewards through the pay-for-performance policy of the National Health Security Office</td>
</tr>
</tbody>
</table>

**KEY MESSAGES**

- Thailand has actively contributed to setting the global agenda on antimicrobial resistance
- The national strategic plan on antimicrobial resistance (2017-21) promotes multisectoral collaboration to reduce antimicrobial consumption and AMR morbidity and improve public awareness
- Strengthening surveillance systems to measure the burden of AMR and the effect of policies must be a priority

### Box 2: Initiatives on AMR in Thailand

- **AMR prevalence†**
  - Important resistant pathogens include imipenem resistant *Acinetobacter* spp, imipenem resistant *Pseudomonas aeruginosa*, vancomycin resistant enterococci, carbapenem resistant *Enterobacteriaceae*, extended spectrum β-lactamase producing *Enterobacteriaceae*, and multidrug resistant and extensive drug resistant tuberculosis
  - Between 2000 and 2014, the prevalence of imipenem resistant *P. aeruginosa* and *Acinetobacter* spp increased from 10% to 22% and from 14% to 65%, respectively

- **Antimicrobial consumption‡**
  - More than 5200 antimicrobial products are registered with the Thai Food and Drug Administration, of which two thirds are for humans and the remainder for animals
  - Antimicrobials account for 15-20% of the total human drug costs, and 50% of antimicrobial consumption is antibiotics; the other 50% are antiviral, antifungal, and other drugs
  - $315m was spent on antibiotics in 2009, which is higher than on medicines for cardiovascular diseases ($260m) and cancer ($275m)
  - Penicillins, cephalosporins and carbapenems are the top three antibiotics consumed.

*Based on data from 2010 for five bacteria: *Escherichia coli*, *Klebsiella pneumoniae*, *A. baumannii*, *P. aeruginosa* and meticillin resistant *Staphylococcus aureus*.†AMR prevalence is based on data from the National Antimicrobial Resistance Surveillance Center, Ministry of Public Health.‡Antimicrobial consumption is estimated from the consumption value as a proxy measure. The drug consumption value is the sum of the drug production and importation values reported by drug companies to the FDA annually. The Thai Surveillance of Antimicrobial Consumption System (Thai SAC), which is under development, will monitor antimicrobial consumption for humans as the defined daily dose per 1000 inhabitants per day, guided by WHO methods, and for animals as the mg per population correction unit, as used by the European Surveillance of Veterinary Antimicrobial Consumption project.

*Based on data from 2010 for five bacteria: *Escherichia coli*, *Klebsiella pneumoniae*, *A. baumannii*, *P. aeruginosa* and meticillin resistant *Staphylococcus aureus*.†AMR prevalence is based on data from the National Antimicrobial Resistance Surveillance Center, Ministry of Public Health.‡Antimicrobial consumption is estimated from the consumption value as a proxy measure. The drug consumption value is the sum of the drug production and importation values reported by drug companies to the FDA annually. The Thai Surveillance of Antimicrobial Consumption System (Thai SAC), which is under development, will monitor antimicrobial consumption for humans as the defined daily dose per 1000 inhabitants per day, guided by WHO methods, and for animals as the mg per population correction unit, as used by the European Surveillance of Veterinary Antimicrobial Consumption project.
Developing the national strategic plan on AMR

Understanding the landscape and complex nature of AMR

Understanding the complex setting and stakeholders was essential to develop appropriate and feasible policies for Thailand to tackle AMR. Thailand has about 24 committees, subcommittees, and working groups related to AMR, almost all under the Ministry of Public Health, and the Ministry of Agriculture and Cooperatives.7 Other government organisations, professional associations on human and animal health, the private sector, and civil society organisations are also involved. However, there was no common platform for these groups to work together.

In October 2014, the Ministry of Public Health held a meeting with all these stakeholders to review past and ongoing initiatives and outline the problem of AMR. The meeting had two key outcomes. First, it led to the technical report on AMR in Thailand. This report gave AMR stakeholders the overall background on AMR and the actions taken by various stakeholders. It also led to a series of discussions between the ministries of public health, and agriculture and cooperatives, which established an AMR coordination and integration committee to develop the national strategic plan.7

Engaging stakeholders

In line with the principle of the global action plan on AMR to include all society,4 action was taken at both the policy and public level to involve a wide group of stakeholders to move the AMR plan forward.

At the public level, the National Health Assembly, which brings together representatives from government, academia, private sector, and civil society from all 77 provinces of Thailand, passed a resolution on AMR. The representatives draft resolutions which are discussed at provincial forums held in each province. The resolution is then finalised and adopted at the national assembly. While not legally binding, the participatory nature of the process gives it legitimacy, creates public awareness and helps implementation.9 In December 2015, the national health assembly resolution on AMR was adopted; it includes various actions for the ministries of public health, agriculture and cooperatives and education, other governmental agencies, national and provincial health assemblies, local government units, civil society organisations, and the private sector.10

At the policy level, government staff and key stakeholders facilitated the development and implementation of the national strategic plan. In May 2015, the Ministry of Public Health appointed the AMR coordination and integration committee to develop the strategic plan. The committee held a workshop with more than 120 key stakeholders from all sectors to get their input. After several rounds of meetings, and public and stakeholder consultations, the plan was finalised and endorsed by the cabinet in August 2016.

Joining forces with regional and global stakeholders

Thailand has made several contributions to tackle AMR at the regional and global level (box 3). The contribution by Thailand to the global agenda on AMR (“inside out”) and the contribution of the global community to Thailand’s affirmative actions (“outside in”) have together created a momentum that has strengthened and sustained national commitment.

Translating the national plan into action

The national plan on AMR is intended to facilitate multisectoral action and achieve measureable outcomes. Figure 1 shows the roles and contributions of different stakeholders. Implementation and evaluation have been planned jointly to monitor progress and ensure accountability.

Programme implementation

The plan (box 4) sets out five goals to be achieved by 2021 which focus on reducing AMR morbidity in hospitals and antimicrobial consumption in human and animal sectors and increasing public awareness.11 Tackling AMR will require the participation of staff in hospitals, clinics, pharmacies, veterinary hospitals and clinics, and livestock, fish, and arable farms to use antimicrobials appropriately, and to prevent and control infections. The plan has a clear long-term focus to strengthen country capacity to reduce AMR guided by WHO’s joint external evaluation tool for the International Health Regulations 2005.12

The strategies to achieve the goals of the national plan include:

- Strengthen AMR surveillance using the One Health approach to cover humans, animals, and agriculture sectors and by disseminating information to prescribers and the public. This initiative will build on the existing national AMR surveillance system and use measures from the global AMR surveillance system developed by WHO for standardised AMR surveillance.
- Regulate antimicrobial distribution by reclassification of certain antimicrobials as prescription-only medicines and ensure effective law enforcement to control antimicrobial distribution.
- Prevent and control hospital acquired infections and improve antimicrobial stewardship to promote appropriate use of antimicrobials in hospitals, clinics, and pharmacies.
- Prevent and control the emergence and spread of resistant pathogens in livestock, fisheries, pets, and crops, and promote appropriate use of antimicrobials in livestock, aquaculture, and arable farms, and veterinary hospitals and clinics.
- Increase public awareness about AMR and promote the appropriate use of antimicrobials.
- Establish a national governance mechanism, such as a national committee on AMR policy and a national coordinating centre, to set policy, coordinate intersectoral actions, monitor progress, and evaluate outcomes in order to implement and sustain AMR actions.

Box 3: Thailand’s contributions to the global agenda on AMR

- As chair of the Group of 77 (G-77), the intergovernmental alliance of developing countries in the United Nations, Thailand supported the political declaration on AMR at the UN General Assembly in 2016 and called for solutions that would not affect access to antimicrobials.
- One of 14 countries that established the Alliance of Champions at the WHO World Health Assembly in 2015 to promote political awareness, engagement, and leadership on AMR among heads of states, ministers, and global leaders.
- One of seven countries in the Foreign Policy and Global Health Initiative that held a ministerial meeting in Oslo in 2014 to discuss ways to improve antimicrobial stewardship, with a focus on ensuring access for populations in low and middle income countries. After the meeting, Thailand was asked by the group to organise a ministerial side event on AMR at the 68th World Health Assembly.
- Lead country on the Global Health Security Agenda action packages for strengthening national laboratory systems and workforce development to tackle infectious disease threats, and contributed to the action package on AMR. Thailand hosted the Asia Pacific regional workshop in 2015 to develop country roadmaps and collaborations to build capacity in these areas.
- Adopted the Jaipur Declaration on AMR in 2011, which is a commitment by member states of WHO’s South East Asia region to preserve the efficacy of antimicrobials and to adopt a multidisciplinary approach to prevention and containment of AMR.
**Goals**

- 50% reduction of AMR morbidity
- 20% reduction of antimicrobial consumption in humans
- 20% increase in public awareness on AMR and antimicrobial use
- 30% reduction of antimicrobial use in animals
- Country capacity addressing AMR achieves score 4 of JEE tool

**Ultimate outcomes**

- Stable or decreasing trends of AMR
- Decreasing health, and economic burden related to AMR

**Royal Thai Government (RTG)-WHO Country Cooperation Strategy programme on AMR (CCS-AMR Programme)**

**Area of work 1** Monitoring and evaluation (M&E) of NSP-AMR implementation by generating mid term and end term report of NSP-AMR implementation and publicly available biennial report on AMR prevalence, antimicrobial consumption, and public awareness.

**Area of work 2** Strengthen capacity of M&E systems to monitor AMR morbidity and mortality, antimicrobial consumption, public awareness, and country capacity to address AMR problems as indicated in joint external evaluation tool.

**Area of work 3** Building capacity for evidence generation including mapping expertise, research gaps, priority setting for research, training etc.

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**Box 4: Summary of the national strategic plan on antimicrobial resistance 2017-21**

**Vision:** Reduction of mortality, morbidity, and economic costs from AMR

**Mission:** Establish policies and national multisectoral mechanisms which support effective and sustained management of AMR

**Goals:**

- 50% reduction in AMR morbidity
- 20% reduction in antimicrobial consumption in humans
- 30% reduction in antimicrobial consumption in animals
- 20% increase in public knowledge of AMR and awareness of appropriate use of antimicrobials†
- Increase in country capacity to tackle AMR to score 4 as measured by the WHO joint external evaluation tool†

**Strategies:**

- AMR surveillance system using the One Health approach
- Regulation of antimicrobial distribution
- Infection prevention and control and antimicrobial stewardship in humans
- AMR prevention and control and antimicrobial stewardship in agriculture and pets
- Increase in public awareness of AMR and appropriate use of antimicrobials
- Governance mechanisms to implement and sustain AMR actions

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**Way forward**

Thailand’s strategic plan for antimicrobial resistance 2017-21 has just started and will require sustained and strong political support. Guaranteed funding and the establishment of a permanent structure, such as the national coordinating centre on AMR to oversee implementation, are essential.

We think a main requirement is to improve existing databases for monitoring antimicrobial consumption and reporting using standardised measurements in

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**Footnotes:**

- AMR morbidity is defined as bacteremia caused by five antibiotic resistant bacteria: Acinetobacter spp., Staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae, and Pseudomonas spp
- A module on public knowledge of antimicrobial consumption and AMR awareness has been included in the 2017 Health and Welfare Survey, which includes 27,000 nationally representative households. The module is a modified version of the Eurobarometer 445
- Country capacity will be measured using the WHO joint external evaluation tool for International Health Regulations (2005).
Box 5: National policies related to AMR

- National Strategic Plan on AMR 2017-21
- National health assembly resolution 8.5 on integrated approaches to address antibacterial resistance crisis (2015)
- National Emerging Infectious Disease Strategy 2017-21
- National Drug Development Strategy 2012-16
- National Strategic Plan on the International Health Regulations (2005) 2017-21
- National Operational Plan on AMR 2015-18 under the Communicable Disease Act 2015

Contributors and sources: NS has expertise in programme planning, and evaluation. She is a technical focal point in developing the National Strategic Plan on AMR, and a programme manager of the Thailand-WHO country cooperation strategy programme on AMR. SW chaired the AMR integration and coordination committee which finalised the national plan, and is a senior consultant member of the National Committee on AMR Policy. SP was involved in the development of the national plan, and the Thailand-WHO country cooperation strategy programme on AMR. NJ has over 20 years’ experience in laboratory systems strengthening, strategic planning, quality systems implementation, and information technology development. WP has worked on data collection and analysis at the National Antimicrobial Resistance Surveillance Center for 15 years. PB was head of the inpatient pharmacy department in a general hospital for 15 years. She has expertise in the development and implementation of medicine policies for public healthcare facilities, and contributed to the development of the national plan. SJ is a senior veterinary officer who planned, and coordinated the antibiotic policy, and AMR and antimicrobial usage containment programme in the livestock sector following the national plan. NK has expertise in pharmaceutical systems, especially in monitoring and information technology work in the field. WK was part of the stakeholder consultation, particularly for the livestock sector, and the final public hearing on the strategic plan. AS is a veterinarian working in animal health systems, and the use of antimicrobials in animals; she participated in the development of national plan. VT is a researcher in health policy and health systems. AS and VT helped develop a major research programme on surveillance of antimicrobial consumption in humans and animals. All authors conceived the structure of the article. NS wrote the first draft. All authors contributed to and approved the final version. NS is guarantor of the article. This article arose from discussions at the meetings during the development of national strategic plan.

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11 Ministry of Public Health, Ministry of Agriculture and Cooperatives. National strategic plan on antimicrobial

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