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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

**A**ntimicrobial 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.<sup>1</sup> To date, 67 member states have finalised their national action plans.

AMR places a high burden on health and the economy in Thailand,<sup>2</sup> 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<sup>6</sup> approach and takes account of the key components and strategic objectives of the WHO global action plan on AMR.

## 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 1: Burden and prevalence of antimicrobial resistance in Thailand<sup>2</sup>

### AMR burden\*

- About 88 000 infections were attributed to antimicrobial resistance (AMR), resulting in at least 3.24 million additional days in hospital and 38 000 deaths
- Direct costs of antibiotics to treat AMR infection were about \$70-\$170m (£54-£132m; €62-€150m; 2400-5800m baht)
- Indirect costs of morbidity and premature deaths related to AMR were at least \$1100m

### AMR prevalence†

- Important resistant pathogens include imipenem resistant *Acinetobacter* spp, imipenem resistant *Pseudomonas aeruginosa*, vancomycin resistant enterococci, carbapenem resistant Enterobacteriaceae, extended spectrum  $\beta$ -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 (\$225m)
- 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 methicillin 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,<sup>3</sup> and for animals as the mg per population correction unit, as used by the European Surveillance of Veterinary Antimicrobial Consumption project.<sup>4</sup>

## Box 2: Initiatives on AMR in Thailand

- 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
- The nosocomial infection control programme was started in 1971
- 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<sup>5</sup>
- An antibiotic awareness day has been held annually since 2013 to create public awareness about AMR and the appropriate use of antibiotics

### 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.<sup>7</sup> 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.<sup>7</sup> 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.<sup>7</sup>

### Engaging stakeholders

In line with the principle of the global action plan on AMR to include all society,<sup>8</sup> 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.<sup>9</sup> 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.<sup>10</sup>

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.<sup>11</sup> 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.<sup>12</sup>

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<sup>14</sup> 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

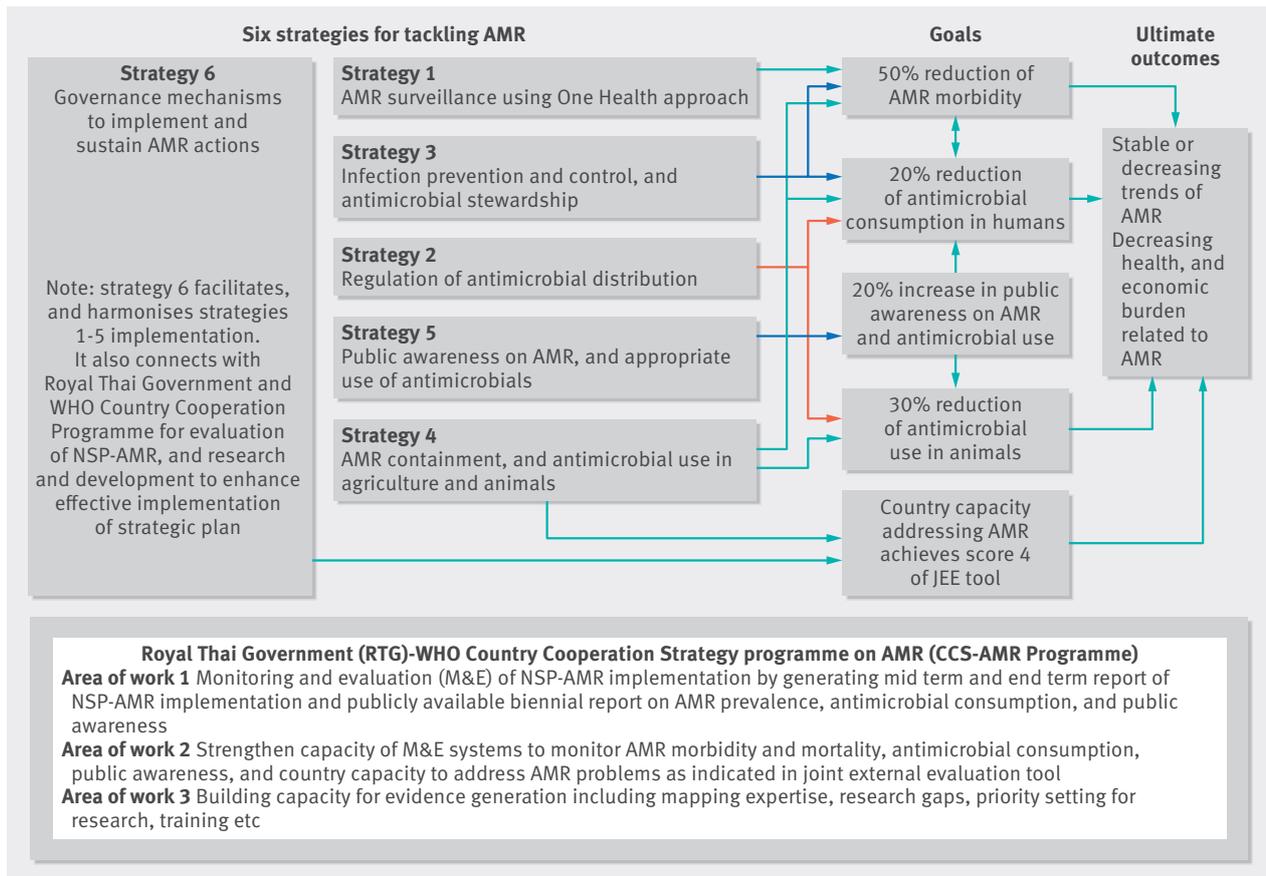


Fig 1 | Framework of the implementation and evaluation of the national strategic plan on antimicrobial resistance (NSP-AMR). Modified from the Royal Thai Government and WHO country cooperation strategy programme on AMR (2017-21)

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

**Vision:** Reduction of mortality, morbidity,\* and economic effects 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

\*AMR morbidity is defined as bacteraemia 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<sup>13</sup>

‡Country capacity will be measured using the WHO joint external evaluation tool for International Health Regulations (2005).<sup>12</sup> The four key capacity areas (AMR detection, surveillance of infections caused by AMR pathogens, healthcare associated infection prevention and control programme, and antimicrobial stewardship activities for human and animal sectors) are given a 1 to 5 score, where 1 = no capacity, 2 = limited capacity, 3 = developed capacity, 4 = demonstrated capacity, and 5 = sustained capacity

**Programme monitoring**

The Royal Thai Government and WHO country cooperation strategy programme on AMR will coordinate monitoring and evaluating the national plan, which has three parts.

- Conduct mid and end term assessments of outcomes and produce publicly available reports every two years on AMR prevalence, antimicrobial consumption, and the status of public awareness
- Strengthen the capacity of monitoring and evaluation systems as indicated in the WHO joint external evaluation tool
- Generate evidence for effective implementation—for example, by identifying priority areas of research and engaging relevant stakeholders.

**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

**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
- National Operational Plan on Infection Prevention and Control 2015-18 under the Communicable Disease Act 2015

humans and animals. Interoperability between hospital discharge summary and civil registration systems needs to be improved for a reliable estimation of AMR morbidity and mortality.

AMR is a component of other national policies (box 5). Support is needed to improve individual and institutional capacities and collaboration between different sectors to tackle AMR. Multisectoral action is complex as stakeholders have their own interests and expectations, but the process of producing the strategic plan has helped develop a shared vision. Information sharing, understanding the roles of different stakeholders, and engaging in joint projects will encourage collaboration towards a common view on AMR.

Thailand has demonstrated commitment to tackle AMR for many years despite the absence of a national action plan. The strategic plan provides a platform for cross-sectoral coordination through a shared vision and has a strong foundation because of the engagement and ownership of relevant stakeholders. Sustained political commitment is essential for the effective implementation of policies and monitoring in the long run.

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