

## ***Antibiotic Smart Use, Thailand*** **Involving community to curb antibiotic resistance**

Driving into the Muaklek sub-district of Thailand's Saraburi province, the first thing that greets the eye are large colorful billboards of a cowboy and cowgirl, promoting an important public health message- on antibiotic resistance.

With pistols firmly tucked in their holsters, they wave three fingers at members of the passing public, each finger standing for a common disease for which there is no need to use antibiotics.

Welcome to the birthplace of the Antibiotic Smart Use project and its '3 Diseases' campaign, a unique Thai initiative to curb inappropriate use of antibiotics and combat growing antibiotic resistance in both hospital and community settings.



### **The pilot project**

Launched over seven years ago by a group of researchers with Thailand's Ministry of Public Health and supported by the WHO the project identified antibiotics as the first priority for research on rational use of medicine as it has a high impact not only on individuals but also on the community as well.

The team decided to focus on three common ailments- upper respiratory tract infections, especially common cold with sore throat; acute diarrhea and simple wounds- for which antibiotics are often prescribed though they are not needed.

In the first phase of the project 10 district hospitals and 87 primary health centres in Saraburi, a medium-sized province with a population of 0.6 million located in central Thailand, were identified for testing whether interventions

could help reduce both prescription and use of antibiotics for these three diseases.

The Saraburi provincial health office facilitated ASU implementation and data collection. Phra Nakhon Si Ayutthaya, a neighbouring province with similar geography, population and health-care delivery system, was purposively selected as the control group.

The project design was also driven by the fact that in general, few resources were available for the fight against the irrational use of antibiotics, which was rampant. Since the rational use of medicines as a concept was not always getting translated into practice, it was felt that the ASU model could be useful in bridging this gap.

“Using available resources to induce individual behaviour change while creating a critical mass of people who could conduct advocacy and promote the rational use of antibiotics was seen as an efficient way to galvanize improvements” says Nithima Sumpradit, part of the initial team of four pharmacists and a doctor, who came together and designed the ASU project.

#### **Box 1: The ABR situation in Thailand**

According to a recent study in Thailand, in 2010 antimicrobial resistance was responsible for at least 3.2 million extra hospitalization days and 38 481 deaths, and for losses amounting to US\$ 84.6–202.8 million (exchange rate: 30 Thai baht per US\$) in direct medical costs and more than US\$ 1333 million in indirect costs.<sup>1</sup>

There is a positive correlation between antimicrobial resistance and the consumption of antibiotics.<sup>2,3,4</sup> In Thailand, the use of new generation antibiotics, such as ceftriaxone and oral azithromycin, has increased over time<sup>5</sup>. Since 2000, antibiotics and other antimicrobials have been the most manufactured and imported drugs in Thailand. In 2009, the total value of antibiotic manufacturing and importation into Thailand amounted to approximately US\$ 367 million, with penicillins, cephalosporins and carbapenems in the lead.<sup>6</sup>

Unnecessary use of antibiotics is seen among both health professionals and the public.<sup>7-8,19</sup> In European countries, systemic antibiotics are prescribed in the greatest volumes to ambulatory patients, mostly for respiratory tract infections.<sup>10</sup> In Thailand, a study in a tertiary care hospital revealed that only 7.9% of the upper respiratory tract infections (URIs) in the facility were caused by bacteria.<sup>11</sup> Despite this, in Thailand most URIs are treated with antibiotics by hospitals, health centres, drug stores and patients themselves.<sup>12,13,14,15</sup> Liberal use of antibiotics endangers the health of patients without observable clinical benefits, since it neither reduces the rate of complications nor quickens recovery when the illness is caused by a virus.<sup>16</sup>

A 2007 review showed that the interventions undertaken by Thailand so far to contain antibiotic resistance had only been partially successful,<sup>17</sup> probably because of the vertical nature of the organizations responsible for the prevention of antimicrobial resistance, the lack of inter-agency coordination and the absence of a focal point in charge of synchronizing activities across agencies. The review found that Thailand's

efforts, upto the time of the review, to promote the rational use of antibiotics were inconsistent, unfocused and scattered across different organizations.<sup>18</sup>

### **Effective communication**

Using easy-to-understand and focused health messages and involving local communities at every step the initiative works through a network of trained health volunteers to raise public awareness on how to conserve antibiotics for those who really need it or for future generations.

On-site training for health professionals consisting of half-day sessions was conducted in the 10 district hospitals. The training focused on educating prescribers and making them feel confident enough to not prescribe antibiotics. An individual training programme was delivered on-site in every district hospital to adapt to the tight schedule of district hospital physicians. Successful experiences were shared during sessions.

Educational materials were given to health professionals for display or distribution to patients, along with instructions on their proper use. They were also given ASU treatment guidelines for URIs, diarrhoea and simple wounds, posters showing diagnosis and treatment algorithms, and diagnostic tools such as white light illuminators for throat examination. Hospitals received seed money for project implementation and evaluation.

“There was a lot of resistance from patients in the beginning when they were denied antibiotics but now there is greater acceptance because of constant education through the project” says Kedsanee Kongsamboon, Director of the Primary Health Centre in Muaklet sub-district.

Kedsanee and her group of trained village-level health volunteers innovated a variety of methods to convince patients as well as community members to avoid use of antibiotics for the three diseases targeted. Apart from door-to-door visits, distribution of well-illustrated and simply written reading material they even organised a special quiz on antibiotics use for both patients and community members. Those with good scores are rewarded with household goods sold at steep discounts and subsidised by local companies.



## Community Acceptance

“At first the health workers were not very well received as the villagers felt they had the same level of knowledge and also the former were after all not fully qualified health professionals” says Nichapha Niyatseengern, one of the health volunteers working among the villagers as part of the ASU project.

According to her, as the community members began learning more about the problems of antibiotic resistance they also became more accepting of advice given by health workers. For the project’s health outreach personnel themselves, who mostly live within the community, this has also meant that have had to become role models in the rational use of antibiotics.

Other strategies for lowering antibiotic use as part of the 3 diseases campaign targeted the high levels of anxiety that many patients have regarding their illnesses or that of people close to them.

Each patient visiting the Muaklek PHC for example is given a thorough briefing by a nurse who also screens them to identify if it is a case of the three diseases targeted by the ASU. The nurse then provides information to the patients about the disease and why it does not need antibiotics for treatment.

Often patients are also given pamphlets to read while waiting for the doctor or information is provided through posters put up in the OPD area. As a result, when the patient finally sees the doctor their expectations of getting an antibiotic is lowered.

## Tailored to local context

ASU staff say that providing a choice of alternative, non-antibiotic therapies facilitates behaviour change. For prescribers, who are not fully convinced about not using antibiotics in the context of the three diseases, or for patients who



insist on getting some ‘pills’ from the doctor the ASU project has struck upon the unusual idea of giving them capsules made of traditional medicine. The ASU project allows doctors to prescribe herbal medicines listed in Thailand’s National List of Essential Medicines, such as *Andrographis paniculata*.

This comes in capsules that resemble antibiotic capsules and is used to relieve fever and sore throat from viral infection. This practice helps alleviate tensions during the transition period in which prescribers and patients undergo behaviour change. At the Muaklek PHC patients are even offered a traditional Thai massage to lower their stress levels.

As if the usual ignorance about how to use antibiotics were not enough ASU campaigners also have had to deal with a problem peculiar to the Thai context. In Thailand, antibiotics are commonly referred to as *ya-gae-ug-sep*, or “drugs that counter inflammation”. This colloquial name is highly misleading, as patients interpret it to mean that antibiotics can alleviate symptoms of inflammation and infection such as swelling, fever and pain.

Similarly, when it came to providing generic, evidence-based campaign materials local partners were encouraged to adapt key messages for their own use and which were appropriate for their cultural contexts. Using locally-developed campaign materials presented by family or community members promoted a sense of community ownership.

“It has taken time but people have got the message and there is a very high level of awareness now” says Krairat Kongrak, the current Director of the Muaklek PHC.



## Measuring Impact

Intervention effectiveness was assessed in terms of four indicators:

- A reduction in antibiotic prescription rates;
- Improved knowledge and attitudes on the part of prescribers;
- Percentage of patients with the targeted conditions who were not prescribed antibiotics (since they did not need them); and
- Patients' perceived health and satisfaction with the treatment outcome.

The pilot phase aimed to reduce antibiotic prescriptions by at least 10%; to increase by at least 10% the number of patient-provider encounters not resulting in the prescription of an antibiotic; and to attain relief of symptoms or full recovery, as well as satisfaction with treatment outcome, in at least 70% of targeted patients.

Impact of the ASU project was also measured by following up on patients who had not been given antibiotics to check their health outcomes. For example, in one district hospital, the hospital director had physicians, nurses and pharmacists collectively observe his practice of not prescribing antibiotics and co-monitor patients' clinical outcomes. Successful treatment outcomes boosted health professionals' confidence in not prescribing antibiotics for URIs, diarrhoea and simple wounds.

"ASU is clearly a workable entry point for efforts to rationalize the use of medicines in Thailand. Its long-term sustainability will require continued local commitment and political support, effective auditing and integration of ASU into routine systems with appropriate financial incentives" says....

## **Phase 2 of ASU project**

In phase 2, the focus was on scaling up effective interventions for promoting the rational use of medicines with an ongoing focus on sustainability. In this phase, ASU expanded to cover 44 hospitals and 621 primary health centres in three provinces (one large, one medium, one small) as well as two hospital networks – a public network in the south of the country and a private one in Bangkok.

To increase the likelihood of sustainability, ASU scale-up was conducted with an emphasis on integrating ASU into routine practice. In phase 2, ASU focused on two approaches.

The first was to decentralize networks among local and central partners and strengthen the capacity of local partners to implement and evaluate ASU. Activities included training of trainers, sharing and promoting ASU good practices and encouraging local partners to conduct ASU-related research in parallel with routine ASU practice to generate scientific evidence for guiding the work of ASU.

Second, policy advocacy aimed at creating a favourable climate for hospital directors or provincial health administrators to support ASU and integrate it into their routine work.

## **Box 2. Factors affecting antibiotic use**

Prescription behaviour can be influenced by predisposing, reinforcing and enabling factors. The first of these categories includes knowledge, attitudes and subjective norms; the second consists of factors such as peer pressure, patient expectations and drug promotion; and the third includes factors that facilitate prescription, such as the prescriber's diagnostic skill and exposure to hospital formularies and treatment guidelines.

Local partners participating in the ASU indicated that, in their settings, irrational drug prescription practices were primarily due to prescribers' poor understanding of antibiotics and their role in disease management, and to perceived pressure from patients who expected or requested antibiotics.

What patients know about antibiotics they learn primarily from health professionals during medical visits and from their social milieu. Local partners participating in ASU have reported that patients often have misconceptions and erroneous beliefs about antibiotics and are seldom aware of the existence of antimicrobial resistance.

When planning interventions, attention must be paid to the complex interplay of knowledge, attitudes and behaviour on the part of prescribers and patients and to the contextual influences emanating from specific health-care settings and communities.

## **Nationwide scaling up**

Two broad assumptions underlie ASU interventions: that the rational use of medicines is a behavioural issue, and that multifaceted, multilevel interventions are essential. ASU project leaders believed that bottom-up approaches at the individual and organizational levels are essential for modifying behaviour; top-down, policy-level approaches and social measures are also needed, on the other hand, to sustain behaviour change.

While the programme's first phase (2007–2008) was part of the bottom-up approach and consisted of assessing interventions intended to change prescribing practices the second phase (2008–2009), took the top down approach to examine the feasibility of programme scale-up through interventions at the network and policy levels.

Thailand's National Health Security Office, for example, has adopted ASU as a pay-for-performance criterion, a major achievement that has led to the programme's expansion nationwide.

Achieving success at the national level for the ASU project was not easy though as presenting evidence on a programme's benefits and feasibility was not enough to successfully conduct policy advocacy. Policy champions from academia, the Health Systems Research Institute and the Ministry of Public Health played an essential role in garnering support for the ASU concept and bringing about changes in public policy.

ASU champions from schools of medicine and pharmacy and from the Thai Ministry of Public Health succeeded, owing to the good results obtained in Phase 1, in having ASU practice included among the pay-for-performance (P4P) criteria of the National Health Security Office (NHSO), the agency responsible for

Thailand's universal health-care coverage scheme.

The P4P is a financial reward mechanism that provides stepwise financial incentives to hospitals based on the degree to which they have implemented ASU. P4P scores, based on self-assessment, range from 1 to 5. 1 indicates that a given hospital has agreed to implement ASU; 2 indicates that it is taking preparatory steps, such as revising the hospital formulary and developing treatment guidelines; 3 shows that ASU is being implemented through training sessions, observance of the ASU treatment guidelines and patient education; 4 indicates that outcome evaluation is under way and that changes in antibiotic prescription practices are being monitored; and 5 signals that ASU outcomes are being disseminated or published.

ASU was included among the P4P criteria for district hospitals in 2009 and for all types of hospitals in 2010. Subsequently, the Drug System Monitoring and Development Centre, a civil society organization funded by the Thai Health Promotion Foundation, supported 22 ASU networks in 15 provinces between 2010 and 2011 to strengthen their activities and boost programme scale-up.

Over time, the P4P assessment process has evolved from self-assessment (2009-2010) with the 5-point scores to an output evaluation in 2011, changing from just 'P4P' to 'P4P with quality output'. The P4P with quality output is based on the rate of antibiotic prescriptions in the three diseases targeted as part of the ASU project.

The scores are divided into 4 levels: not more than 20% (5 points); 21-30% (3 points); 31-40% (1 point); and more than 40% (no points). Hospitals that prescribed antibiotics not more than 20% in the context of the targeted diseases will receive a full score (5 points) and therefore receive the highest financial reward, compared to the other groups of hospitals. Hospitals with the rate of antibiotic prescriptions in the targeted diseases greater than 40% will receive no points and no financial reward either.

The 'P4P with quality output' is a result of accumulating experience from work carried out by the ASU networks. For example, the e-tool program, used by NHSO for analyzing prescribing databases, was initiated by the ASU team in Choempae district hospital in Khon Kaen province and was later adopted and modified by NHSO to use nationwide. The benchmark of 20% was derived from studies conducted by the biggest teaching hospital in Thailand. It is interesting to note that domestic evidence appears to be more powerful than international evidence to convince prescribers that the 20% benchmark is practical in the Thai context.

**Box 3. "Mirror, mirror on the wall, do I need antibiotics at all?"**





Holding up a simple concave mirror to consumers trying to buy antibiotics for treating the common cold and cough is part of a new initiative in Thailand by community pharmacists to lower consumption of antibiotics.

In an innovative step to convince clients insisting on using antibiotics pharmacists have installed the mirrors in their shops along with a chart of the human throat indicating what it would really look like in the case of a bacterial infection. Customers are given a torch to shine up their throats and look in the mirror to see if it resembles the picture given in the chart and decide whether or not they think antibiotics are needed.

The idea was initiated by a community pharmacist who pioneered use of the ASU strategy in her own pharmacy, despite knowing that many patients insist on purchasing antibiotics. To reduce the tensions between patients and herself, she simply put a dressing table mirror on a pharmacy counter beside an ASU pamphlet describing differences between viral and bacterial infections of the throat. Every time customers requested antibiotics she encouraged them to check their sore throat in the mirror, and explained to them differences between viral and bacterial infections. After that the customer would be asked to decide whether they still wanted to purchase antibiotics. She found that a significant number of people decided not to by antibiotics after checking themselves with this device and were satisfied with this approach.

The idea was picked up by a pharmacist from the Thai Food and Drug Administration who designed the mirror toolkit as part of an intervention package used by the Community Pharmacists Association of Thailand (CPAT) for its ASU pilot project. The CPAT, which has over 4000 members across Thailand, plans to continue promoting rational use of antibiotics.

Along with the mirror toolkit some doctors also use their cell phones to capture a picture of the sore throat i.e. the redness of the sore throat and show it to the patient. They then tell them 'this is what I see from your sore throat. It is just red and does not have an indication of bacterial infection. You decide what medicine is needed to treat

your ailment' This method is very often more convincing to the patient according to the ASU project staff.

"The key thing is that you need to get the people involved in taking decisions regarding their health" says Nithima Sumpradit of the Antibiotic Smart Use Project, which works closely with the community pharmacists association.

### **ASU Phase 1 and 2**

According to ASU project officials the multifaceted, multilevel interventions undertaken in phase 1 and phase 2 to implement and scale up the ASU were successful. Among the indicators of success are the following results after Phase 1 and 2 of the project were completed:

#### ***a. Positive effects on reducing antibiotic prescribing***

- Antibiotic use decreased by 18% - 46%.
- Percentage of patients who did not receive antibiotics increased by 29.1%, whereas there was no change in the control group.

#### ***b. Patient health and satisfaction***

- Of 2,286 patients who did not receive antibiotics, almost all (96%-99.3%) recovered and felt better within 7-10 days after the medical visits.

#### ***c. Success in scaling up***

- The number of hospitals adopting ASU increased from 44 hospitals (2008) to more than 600 hospitals (2010).

### **ASU Phase 3**

The third phase of the project (2010–present), is currently in progress with steps being taken to identify mechanisms for programme sustainability

via policy advocacy, network strengthening and the development of new social norms on rational use of antibiotics. Phase 3 is also aimed at vertical and horizontal scaling up of the ASU project. Horizontal scaling up emphasizes expanding and strengthening decentralized ASU networks whereas vertical scaling up focuses on integrating ASU into national policies.

#### **Horizontal scaling up**

Horizontal scaling up began with the Drug System Monitoring and Development Centre (DMDC), a non-profit civil society organization led by Dr.Niyada Kiatying-Angsulee expanding ASU to 15 provinces in 2010-2012. In 2012, During 2012-2013, ASU was expanded into new settings such as teaching hospitals, community pharmacies, communities and medical/pharmacy students. It is important to note that the 2012-2013 expansion results from a combination of ASU and a newly launched national medicines policy in 2012, which includes strategies for promoting rational use of medicines (RUM) and combating antimicrobial resistance (AMR).

In 2013, the ASU-Kids project led by the Queen Sirikit National Institute of Child Health, with support from DMDC was initiated to promote responsible use of antibiotics in treatment of children. In 2014, DMDC partnered with NHSO, Department of Medical Services and ASU to launch the first Antibiotic Awareness Day campaign in Thailand. ASU-Kids and public campaigns by medical students was officially launched as key features of the Antibiotic Awareness Day 2014.

Despite limited resources, the ASU programmes success has been ensured by the promotion of local ownership and mutual recognition, which have generated pride and commitment. According to ASU managers the decentralized network approach promotes local ownership, mutual respect and social recognition.

Local partners are given full autonomy in naming their own ASU projects and designing culturally sensitive interventions and media materials. This, in turn, generates a sense of ownership, pride and long-term commitment. The interventions implemented at the network and policy levels showed the feasibility of programme scale-up and sustainability. Some local partners applied ASU methods to promote the rational use of medicines other than antibiotics. Others conducted parallel ASU-related research and won research awards.

#### **Box 4. Principles of Antibiotic Smart Use**

The guiding principle of ASU is that antibiotics should not be used to treat non-bacterial infections. ASU started by attempting to reduce the unnecessary use of antibiotics in patients with three conditions: URIs, especially the common cold with sore throat; acute diarrhoea and simple wounds. The programme targets ambulatory patients older than 2 years and in good general health. Patients who are hospitalized or who have diabetes, a compromised immune system or any other serious health condition are not eligible for participation.

To facilitate its adoption, ASU is assessed in terms of five dimensions:

- Simplicity;
- Compatibility with providers' values;
- Advantages relative to current practice;
- Testability; and
- Observability (i.e. the extent to which anyone can observe ASU activities and outcomes). <sup>19</sup>

#### **Vertical scaling up**

Vertical scaling up of ASU was first started when the NHSO adopted ASU as part of P4P policy in 2009. During 2010 – 2011, the financial incentives used in connection with P4P were greatly reduced. In 2012 – 2014, the P4P changed from self-assessment to output evaluation together with a great increase in financial incentives. A series of training sessions was held by the 12 regional offices of NHSO on the 'P4P with quality output' policy, updated clinical knowledge, learning about good tactics/practices to change prescribing behavior and monitoring and evaluating prescribing data using the computerized e-tool program. The database from 892 hospitals collected by NHSO showed the reduction of antibiotic prescriptions. A majority of antibiotic prescriptions in upper respiratory infections decreased from 50-60% (2012) to 40-50% (2014) and those in acute diarrhea decreased from 50% (2012) to 30-40% (2014).

For its continued success in future it is crucial that ASU be incorporated into relevant national policies. The 2011 National Drug Policy on the rational use of medicines, which comprises national strategies for the containment of antimicrobial resistance, as well as other policy movements offer an opportunity to consolidate ASU and other initiatives pursuing the same ends into a comprehensive roadmap for the containment of antimicrobial resistance in Thailand. These policies, despite not being law, reflect a strong commitment to support the rational use of medicines in Thailand.

However, it is important to note that there are a number of other policies developed by national and local agencies and these policies are ultimately implemented by healthcare facilities. Thus, healthcare facilities need to manage to comply with policies and each policy may receive a different degree of prioritization. A key question is 'how can ASU be sustained under changing contexts?'

Due to limited resources and the need to empower local ASU networks to be self-reliant, the central ASU team has not provided any grant to local ASU networks since 2013 and has reduced its interference in local implementation of ASU. However, local networks will receive technical support and educational materials for health professionals and the public upon request. This step-down approach of the central team is to stimulate local ASU networks to manage their own resources and administration in order to sustain ASU practice as part of their routine.

The ASU project is having an impact beyond the borders of Thailand too and is now seen as a model for replication in other parts of south-east Asia with interest elicited from as far away as Africa and Latin America.

#### **Box 5: Operational modalities**

ASU is run by a multi-disciplinary team of health professionals whose common objective is to promote the rational use of antibiotics. The programme is organized at two levels: a network of multidisciplinary groups (i.e. local partners) at the health-care delivery level, and a network of policy-makers, academics and researchers from national agencies and universities (i.e. central partners).

ASU was first organized as a research project to be tested in one province (phase 1) and directed by researchers from Thailand's Ministry of Public Health and from schools of medicine and pharmacy. In subsequent phases, this team collaborated with policy-makers, academics and researchers from national health agencies to form central partners.

The ASU network follows a modified starfish model, in which management has no hierarchical leadership.<sup>20</sup> The local partners include physicians, pharmacists, nurses, health volunteers, local administrators and community leaders who promote the rational use of antibiotics in their health-care settings and communities. They name their own projects and design their own methods for improving the use of antibiotics among health professionals and the public.

The central partners play catalytic and supportive roles; they guide and harmonize



activities across local partners and disseminate examples of good practice and success stories drawn from local partners. In this manner, ASU gradually came to be owned by the local partners, who work with central partners as part of a collaborative network designed to translate the concept of ASU into practice.

## **Critique of ASU**

In focus group discussions, health professionals have expressed the view that ASU is not complex and that it is compatible with their professional values, which are, namely, to procure patients' safety and good health. ASU is easy to test and its outcomes can be easily observed, since the targeted diseases are self-limiting and not life-threatening. However, opinions were mixed when it came to the relative advantages of ASU. Its financial advantages were discussed at length. Under the capitation payment system – in which health-care providers are paid in accordance with the number of registered members of health insurance schemes in their catchment areas rather than the quantity of the services they provide – ASU is beneficial because it minimizes expenditure on unnecessary antibiotics and allows profit margins.

However, in a fee-for-service payment system, in which health-care providers' income depends on the quantity of the services provided, including the number of drugs prescribed, ASU is not attractive to hospitals unless they can somehow cover the income loss resulting from fewer antibiotic prescriptions.

Implementing ASU in large hospitals, where antibiotics are used indiscriminately to treat URIs, is difficult. ASU's primary aim is not to reduce costs; it cannot generate attractive savings for these hospitals, unlike other interventions targeting high-cost medicines. Furthermore, in district hospitals physicians trained in ASU are often rotated to other settings, which makes it necessary to train incoming physicians. Resistance to change is common among physicians. Finally, Thailand is short on the resources and capacities required to audit antibiotic prescriptions.

ASU has several other limitations too. Because the network is decentralized, there is no formal reporting to a central authority on local activities or spending by local partners. This makes the cost-effectiveness of the programme difficult to assess, especially since ASU has been integrated into health professionals' routine work.

Inconsistencies between the diagnostic codes of the International Classification of Diseases, 10th Revision, and the conditions listed in ASU's treatment guidelines also make it difficult to assess the use of antibiotics for the treatment of specific conditions, especially simple wounds. ASU is vulnerable to the influence of external, uncontrollable factors, such as sudden influenza outbreaks or changes in policy, or in the political interests of relevant stakeholders; outcomes may not be as expected despite attempts to adjust the programme in the face of changing circumstances.

"ASU is a cross-cutting exercise that seeks to promote the rational use of

medicines by strengthening human resources, improving health facility infrastructure and empowering communities” says Nithima pointing out that antimicrobial resistance and the irrational use of antibiotics have no simple solution. The advantage of the ASU project though is that it can be applied to rationalize the use of medicines other than antibiotics also.

According to the assessment of the ASU staff the project’s sustainability depends on programme ownership and commitment by local teams, an enabling environment and integration into routine systems with appropriate financial incentives and an effective audit system.

### **Lessons learnt**

Firstly, ASU is a workable model for promoting the rational use of medicines and has yielded several lessons.

Second, in some Latin American countries, dispensing antibiotics by prescription only has reduced their consumption in the short term, but the long-term effect of such a policy remains undetermined.<sup>21</sup> This suggests that the rational use of medicines is indeed a complex issue that cannot be addressed by only top-down approaches, which trigger resistance and non-compliance.

In addition, the Thai health system is structurally conducive to the overuse of antibiotics because it allows physicians to dispense drugs, pharmacists to prescribe them and patients to medicate themselves. Regulatory capacity is insufficient and measures limiting people’s access to antibiotics are not properly enforced. Therefore, top-down approaches (e.g. regulation) must be supplemented with bottom-up approaches (e.g. community empowerment) for long-term results to be achieved.

Third, in Europe and the United States, public campaigns to promote the rational use of antibiotics, with correct treatment of URIs as a common theme, have reduced the unnecessary use of these drugs.<sup>22,23,24</sup> Thus, the concept of ASU and awareness of antimicrobial resistance should be promoted through public campaigns targeting individuals, organizations and the community at large, as in the fight against tobacco and alcohol. However, achieving a meaningful reduction in unnecessary antibiotic use without jeopardizing the successful treatment of bacterial infections and without generating public panic with respect to antimicrobial resistance or a fear of lawsuits due to preventable nosocomial infection of bacterial resistant strains is a challenge.

Table 1. A summary of key multifaceted and multilevel interventions conducted as part of the Antibiotics Smart Use (ASU) programme, Thailand

Multilevel Interventions	Multifaceted Interventions			
	Educational measures	Managerial measures	Incentives	Policies and regulations
<b>Individual and organizational levels</b>	<ul style="list-style-type: none"> <li>– Training on treatment guidelines, provision of materials facilitating behaviour change</li> <li>– Increasing physician confidence in not prescribing antibiotics in responding appropriately to patients' expectations and requests on antibiotics</li> </ul>	<ul style="list-style-type: none"> <li>– Revising antibiotics listed in hospital formulary</li> <li>– Using a white light illuminator to examine the throat and improve diagnostic accuracy</li> <li>– Prescribing herbal medicines for non-bacterial infections</li> <li>– Providing patients with accurate information before they see a doctor</li> <li>– Providing a guideline on ASU planning, implementation and evaluation, including evaluation tools</li> </ul>	<ul style="list-style-type: none"> <li>– Promoting good practices via the ASU web site, social media and newsletters distributed to all health facilities and provincial health offices</li> </ul>	<ul style="list-style-type: none"> <li>– ASU-related policy at the hospital and/or provincial level</li> </ul>
<b>Network level</b>	<ul style="list-style-type: none"> <li>– Training of trainers for drug prescribers and ASU project managers</li> <li>– Education via social media and peers</li> </ul>	<ul style="list-style-type: none"> <li>– Developing a set of computer software commands to support the auditing of antibiotic use</li> <li>– Encouraging local ASU partners to conduct parallel ASU-related research and present their work in technical forums</li> <li>– Sharing tools and materials produced by local partners to facilitate cross-sharing and learning</li> </ul>	<ul style="list-style-type: none"> <li>– Sharing lessons learned within and outside the ASU network</li> <li>– Supporting and promoting ASU good practice sites for domestic and international study visits</li> </ul>	NA
<b>Policy level</b>	NA	NA	<ul style="list-style-type: none"> <li>– Advocating the inclusion of ASU among the pay-for-performance criteria of Thailand's National Health Security Office</li> </ul>	

**Interview with Nithima Sumpradit, Antibiotic Smart Use Project, Thailand.**



**What has been the impact of the ASU project at the level of the community hospital?**

**Nithima:** The NHSO data shows overall reduction of antibiotic prescriptions although it varies from hospital to hospital. In some hospitals, health professionals transfer their knowledge to health volunteers and villagers in the community and some of them initiate community-based outreach program. This may be because they realize that prescribing behaviour is not influenced by the knowledge of the prescriber alone but also expectations and pressure from the patients to receive antibiotics as well.

While designing the ASU project we thought of all the factors that may influence prescribing behaviour. We categorize factors in terms of predisposing factors like knowledge, attitude, confidence; enabling factors like environment or availability of antibiotics or alternative drugs for non-antibiotic therapy and then the reinforcing factors, for example, pressure from patients or from other prescribers. Then, we prioritized these factors and designed the intervention to address them.

**So you had to understand the social, economic and cultural factors to design the ASU projects. Have your assumptions proved right or did you have to make modifications?**

**Nithima:** Understanding the social, economic and cultural factors is important but still these factors could vary across settings or areas. Thus, ASU interventions needed modification to fit contexts. Especially when we are to expand ASU from community hospitals to other settings such as big hospitals, pharmacies and communities.

**Can you give some examples?**



**Nithima:** For example, in big hospitals, health professionals usually argue that ASU is not applicable to their OPD because their patients are sicker compared to community hospitals, and therefore the rate of antibiotic use should be higher. To convince prescribers in big hospitals, international literature is important but it alone is not enough to trigger changes. A common justification is that the context in Thailand differs from that described in international studies, mostly conducted in Western countries. For example, they assume that a simple wound in Thailand may be more vulnerable to get infected because Thailand's weather is hot and humid; patients who work in agriculture fields may be exposed to dirt and so on. To convince them, relevant evidence to Thailand's context or their own local contexts is essential. For the community pharmacists the aspect is different from public hospitals because they are from the private sector and need to balance between professional practice and profit. So we can help them minimise the pressure from the patients by making the patients take a more active role or involvement in the decision to take antibiotics.

My favorite example is from my experience of working with communities. One community member mentioned that since antibiotic resistance is a very serious issue how come we [the ASU central team] use cartoon characters in educational materials. Only real people and real things should be depicted! Later on, people from this community created their own posters that were so meaningful. The posters are personalized to individual families and this simple device transforms them into presenters/ambassadors promoting rational use of antibiotics. There are so many creative ideas like this among the many communities we work with.



### What has been the experience of nationwide scaling up?

**Nithima:** I think scaling up is perhaps the hardest part for ASU because the scale is big – a nationwide level, types of settings are many, contexts are varied. And most important point of all – input-output relationships are not always linear as

you might expect and there are a number of uncontrollable factors that may influence this scaling up process. However, to manage this complexity, we use two strategies. One is the vertical scaling up which involves policy and regulations but another is the horizontal scaling up which is the network management, building trust, local ownership, and relationship and getting a buy-in from the community to accept ASU as their own concept. We use the framework developed by WHO while scaling up.

**What is the impact of ASU in terms of antibiotic use beyond the three diseases you have targeted?**

**Nithima:** We anticipate that ASU may reduce the number of OPD visits, especially in tertiary care hospitals. This is because the targeted diseases in ASU are self-limiting. In the ASU project, patients have learned about the types and duration of symptoms associated with their diseases so that they may not feel so worried. They can conduct a basic assessment of their condition if they need to see a doctor. Once the patients have direct experience of how to assess their condition and take care of themselves, this could reduce the number of OPD visits. Decreased number of OPD visits of common diseases can reduce workload for health professionals, especially those in big hospitals and health professionals may have more time for sicker patients.

Second, I think ASU is a platform for learning and for capacity building for people engaged with ASU, including myself. Some of the ASU networks have said they will use the knowledge and experience from ASU planning and implementation to apply in solving irrational use of other medicines. A final contribution is about the network development. ASU is a starting point that facilitates stakeholders at the national, provincial and local levels to gather and work together.

**Can you explain the use of traditional medicine as part of the ASU approach.**

**Nithima:** We use a couple of traditional medicines in the ASU project which are from the national list of essential herbal preparations. These are prescribed to the very concerned patients only. Normally we will not prescribe anything for viral infections but sometimes patients are still very worried about their symptoms and would like to get some medicine. So the doctor or nurse will have the choice to prescribe traditional medicine.. These traditional medicines are used for the short term period because the disease is a self-limiting one and will not last long anyway. In addition, some prescribers find that prescribing traditional medicines could increase their confidence while not prescribing antibiotics as well.

**What is the next step for the ASU project? What are the challenges you see?**

**Nithima:** I think there will be couple things. First, due to recent positive trends of combating antimicrobial resistance (AMR) at global and national levels, ASU could be integrated as a measure in AMR-related policies and health systems. Second, the ultimate goal for ASU is to set social norms on responsible or rational use of antibiotics. The challenge is that changing the existing social norms is not easy and it always takes a long time. Today, although the situation may be better but still many people are vulnerable because they know very little about antibiotics but have very positive attitude about them. Finally, we are

currently reviewing the whole journey of ASU. ASU was started in August 2007 and it is now 7 years. There are lots of knowledge and experiences that need to be extracted and documented. ASU is like many initiatives, it started as a research or pilot project and is now confronted with classic questions such as 'how does it sustain itself after the research project ends, the research team withdraws from the community or no external funding remains to support local networks?' or 'how does ASU scale up and sustain?' and so on. Within these 7 years, we witnessed many 'up and down' moments of ASU and ASU networks. This 'up and down' is not unusual as the project is supposed to be dynamic, not static for policies, people, contexts, resources and so on. Thus, in 2014 we have started a new study trying to understand the scaling up process of ASU as Complex Adaptive Systems. We think this study will benefit by providing some guides to other similar initiatives.

### **Could you tell us how the interaction with ReAct was useful for the ASU project?**

**Nithima:** We first interacted with ReAct around 2008 or 2009 when Mary [ReAct] came to visit and Dr.Niyada arranged a small meeting with Thai colleagues to discuss about antibiotic resistance situations, what Thai colleagues have done, what ReAct has done, and what's next. That was a starting point and it is now about 5-6 years already. We appreciate ReAct for being such a good catalyst to connect 'antibiotic fellows' from different countries to know each other and share experiences. Interactions among like-minded people are important when you need to create a momentum on something. Involving, having or supporting ASU to join international forums is another key contribution from ReAct as it helped in disseminating the ASU concept and building networks. Lastly, I think a study visit from ReAct and its affiliates to ASU local networks in May 2011 was very meaningful. It is not just for exchanging information and experiences. But, I think it is an intrinsic reward for local networks including health professionals, community leaders and villagers who are the real change makers.

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